DEVELOPMENT OF AN OPTIMAL PORTFOLIO OF ASSETS FOR A TEACHER INVESTOR SUBJECT TO RISKS. (A CASE OF SECONDARY SCHOOL TEACHERS IN MBEERE SOUTH DISTRICT).

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DECLARATION

I declare that this research project is my original work that has not been presented in any other University or College.

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DEDICATION
I dedicate this research project to my dear mother Esther and my late dad Junias Njue, my sisters and only brother, Utuku. Special dedication to my loving husband Peter Njiru, my children Éva, Mugendi and Wachira for their unwavering support.
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Special acknowledgement goes to my lectures departments of Finance and Accounting, Business Administration and to all my friends and well wishers for their support and encouragement.
ABSTRACT
The main objective of any business organization is to maximize profits or rate of return on capital/investment. In order to achieve this there is need for an individual investor to develop an optimal portfolio of assets that will maximize his rate of return subject to his risk preference. Informed decision making on investment would help avoid risky, low return yielding assets. Efficient market hypothesis by Fama F. and French R.R.(1992) states that current prices of securities and other assets should reflect their level of risks and hence their expected rate of return. However, due to inefficiency in the market, the prices given do not reflect the marginal cost of investments including the wage rates of labour. This accounts for the low returns on teacher’s investment in education and other areas as reflected by the mass media in the past few years. Daily Nation (2nd October 1997, 24th January 2009 among others) and increased demands for pay hikes by trade unions representing them (K N.U.T and K.U.P.P.E.T). The researcher researched on how secondary school teachers (who are the elite and most widespread potential investors in education and other sectors) could develop and maintain an optimal P.F of assets. Teachers impart a lot on the community by the nature of their profession and this would create job opportunities. This is vital for effective service delivery, achievement of millennium goal of education for all (EFA) and realization for vision 2030. The main problem was ‘how teachers could develop and maintain an optimal portfolio of assets that maximizes their returns from investment subject to risks’. According Reilly Etal. (2006) there’s need for investors to shift their attention to what they “can keep” and not what they can “earn from investments”. The researcher carried out a descriptive research in order to obtain data that would help identify various investment opportunities available to teachers and the constraints faced in their attempts to invest as well as how best to diversify their investments in order to minimize risks. The researcher, identified various risks to investments through application of portfolio theories, CAPM theories and multifactor theories to show how an investor could choose optimal P.F. Risk management strategies should be adopted to minimize risks. Primary data was obtained using questionnaires on teacher’s selected using stratified sampling of forty teachers in sixteen secondary schools out of three hundred and ten teachers in thirty five schools (sample proportion of 12.9% which is greater than the recommended 10%) Mugenda and Mugenda (1999). This sample was selected from the four divisions namely: Mwea, Gachoka, Kiritiri and Kiambeere in Mbeere South district. The primary data obtained was analyzed and presented using charts to determine the types of investments that have been neglected which could yield higher returns. Application of computer software programme (S.P.S.S) on the primary data helped in calculating rates of return on individual assets and portfolio of assets and their averages as well as their standard deviations for the year 2008/2009. Risk per unit of return was obtained by calculating the coefficient of variation (CV) which is a standardised measure of risk per unit of return. The main limitations to the study were lack of adequate funds to carry out research for the whole district as the researcher was a self sponsored, school based student. This research is significant as it would expose the teachers / investors on available investment opportunities and limitations in the district/market. It was to help identify risks exposed to returns on investments; risk management strategies which if adopted would help develop Entrepreneurial culture /accumulation of human capital reduce unemployment level in line with vision 2030 of having an industrialized Kenya.
LIST OF ABBREVIATIONS

AHPR = Annualized Holding Period Return on investment.

\( \bar{\text{Avg}} \) = Average annual rate of return on investment for a given period.

**CAPM Theory** = Capital asset pricing model

\( (CV) \) = Coefficient of variation is a standardized measure of variation that shows the Level of risk per unit of return.

\[
CV = \frac{r^n}{6}
\]

where \( r^n \) = the expected rate of return

\( 6 \) = the standard deviation

\( HPR = \text{Holding period return} = \text{Income from Asset} + \text{Price change} \)

\[ \text{Purchase price} \]

\( \text{ER}_i = RFR + Bi (Rm-RFR) \)

\( \text{ER}_i = \text{Expected returns for asset } i, RFR = \text{Risk Free Rate of returns, } Bi = \text{Beta is the Systematic measure of risk.} \)

\( PF = \text{Portfolio which is the collection of assets held by an individual or organization} \)

\( \text{KNUT} = \text{Kenya National Union of Teachers.} \)

\( \text{KUPPET} = \text{Kenya Union of Post Primary Education Teachers.} \)

\( \text{R}_i = \text{Average annual rate of return for P.F period } i, \overline{RFR} = \text{The average annual rate of return on risk free asset period } i \)
DEFINITION OF TERMS

Business risk is the uncertainty of income flows from a business as asset prices change due to the nature of the firm's business.

Cash flows are the inflow or outflow of funds to and from an individual or business. Expected returns are the cash inflows that an investor expects to receive in the future in order to compensate him for postponing his current consumption for a future one, for the change in inflation rate and for the uncertainty of future returns.

Financial risk is the uncertainty in firms' income flows or asset prices as a result of the methods that the firm or individual uses to finance its assets.

Holding period is the time an investment is held by an individual or a firm.

Inflation is a situation where prices of goods and services are rising rapidly lowering the purchasing power of money. This leads to inflation premium which increase the nominal risk free rate of return in order to compensate the investors' loss in purchasing power.

Investment is the current commitment of resources for a period of time in expectation of receiving future resources that will compensate investors for resources committed, expected rate of inflation and uncertainty of future returns.

Liquidity risk is the possibility or inability to sell an asset at a fair market price.

Optimal portfolio is a combination of assets that would maximize the returns for an individual or an organization subject to the prevailing levels of risk hence the best combination of assets.

Portfolio is the overall collection of real and financial assets owned by an individual or an organization.

Price is the exchange rate for goods and services that reflects the marginal value or the total value of a commodity.

Real risk free rate of return (RFR) is the expected return required to compensate the investors for forgoing their present consumption of funds in hope of enjoying more funds at a future date in a risk-free environment.

Risk is the chance of not meeting investment goals due to uncertainties over time. Risk can be divided into:

i. Systematic risk/market risk/non diversifiable risk which cannot be eliminated by diversification.
ii. **Diversifiable risk** which is firm based and can be eliminated by a diversification.

**Risk free rate of return** is the expected rate of return required to compensate the investors for forgoing present consumption of their funds to a future date in a risk free environment; it’s the reward for postponing spending.

**Risk premium** is the expected return above ($r_{RF}$) risk free rate of return required to compensate the investors for placing their funds at a risk.
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CHAPTER ONE

1.0: INTRODUCTION

This chapter explains the vital role played by teachers in shaping the future generations by imparting knowledge and skills among pupils and students thus explaining the researchers concern in maximizing the returns on their investments. This chapter also identifies the researcher’s problem, general and specific objectives, research questions, significance of the study as well as its limitations. Teaching is considered as a noble job that requires discipline, dedication and devotion. It is important that the working environment remains conducive for effective delivery of services. However, frequent media reports on teachers demand for pay hikes in the past few years; Daily Nation(2nd October 1997, 21st October 1998, 24th January 2009, 3rd March 2010), among others, coupled with massive transfer of teachers into the private sector and other public sectors reflect a state of discontentment. This has caused shortage of teachers in schools even after introduction of bonding for of those going for further studies, raising concern as to what can be done to raise the low returns on teachers’ investment in education. Teachers investments in other areas are equally low as they are in school most of the time and hence no time to monitor their investments.

Due to the vital role that teachers play everybody in the community ranging from the small pupils to the politicians are concerned with the teachers’ performance. They are the most widely spread civil servants and if their investments were to expand, it would create job opportunities reducing the problem of unemployment. If teachers’ returns on investment in education increased it would promote accumulation of human capital which is a prerequisite to achievement of the vision 2030 of having an industrialized Kenya. The researcher therefore intended to encourage them to shift their attention from what they ‘earn’ to what they could ‘retain’ out of their earnings by identifying various investment strategies that are available and ways of maximizing returns subject to risks.

1.1: Background to the study.

Teachers play an important role in shaping the future generation by imparting knowledge and skills to them. The teaching profession was highly regarded in the community. The
Kenyan government set up the Teachers Service Commission (T.S.C) by an Act of parliament Cap 212 of the Laws of Kenya in 1967. It's mandated to register, recruit, remunerate deploy, promote, discipline teachers and maintains teaching standards in public educational institutions in Kenya. The commission works with officers from the ministries Education like District Education Officers (D.E.Os) and Board of governors who act as their agents. The secondary school teachers are paid the same basic salaries depending on their level of education for the first two years after which they are automatically promoted to the next job group. Later on, teachers get yearly increments and promotion based on merits which leaves a loophole as they are evaluated mainly on basis of students' performance which is influenced by many factors such as the entry behavior of students, their discipline levels, working environment, resource availability, and relation with the agents/sponsors among others.

The low returns on teachers investment in education is reflected by the increased number of teachers taking parallel courses in colleges and universities with a hope of earning extra returns or quitting the profession if opportunities arise. The massive influx of teachers going for upgrading courses has led the T.S.C to introduce bonding where teachers have to remain with the commission for at least two years after completion of their course. The cancellation of study leave with or without pay as reflected by T.S.C circular number 7/2010 dated 10th May 2010 reduces chances for teachers going for further studies. Like other investors, teachers source of funds for investment are mainly savings, inheritance, loans and hence their returns on investments in education as well as other investments must cover the costs as well as the risks to investment. With the high rate of inflation and the fact that teachers are widely spread in the rural areas where African socialism is pronounced, there is high dependence on the working by the members of extended families, leading to low saving and low investment in real estates and financial assets among others. This leads to low returns.

Teachers are expected to attend morning assemblies before 8.00am especially on Mondays and Fridays, teach, mark students work, and counsel them among other duties hence no time to monitor their other businesses if any. The T.S.C. Code of conduct and Ethics published Legal notice (2003) number 137 section 15(1) b prohibits teachers from carrying out a
competing business. According to efficient market hypothesis by Fame E.F. and French R. (1992) current market prices of assets should reflect all the information available in the market hence price of assets and other investments should reflect their costs including their level of risks and thus their expected return if the market is at equilibrium. However due to imperfections in the market and information asymmetry, the returns, prices, wage rates, exchange rates do not reflect the marginal costs or the opportunity cost leaving a gap to be filled by research as identified in the book, Price theory and application (Landsburge S.E., 2005). There is need to shift attention from how much can be earned from an investment to how much can be retained from an investment Reilly and Norton (2006). Teachers need to search ways of maximizing their returns from investment as well as reducing uncertainty of such returns by selecting an optimal P.F of assets for investment.

1.2: Statement of the problem.

According to Wolf A. (2007) wages earned do not reflect the marginal product or the opportunity cost, a gap identified by Landsburge (2005). Due to the low returns on teachers’ investment in education and other areas as reflected above, the researcher sought to identify how a teacher investor could select an optimal P.F of assets that would maximize his returns subject to his risk preference. This was done by identifying the various investment opportunities open to the teachers and how well they allocate the investment among the various assets in order to develop optimal portfolios by carrying out a research on teachers in Mbeere south district. She identified the various investment constraints faced. There was need to identify how risks and returns are related through application of existing theories like portfolio theory, CAPM theory and multifactor theories and hence how risks could be minimized to increase returns through application of secondary information on existing risk/return theories. Various risks management strategies needed to be identified to achieve these goals. Constant monitoring and evaluation of the portfolio of assets by a teacher investor is vital. The researcher illustrated how rate of return on investment, standard deviation of returns and risk per unit of return (coefficient of variation) on a assets could be calculated on basis of data collected to determine which assets in their P.F needed to be sold or purchased and whether the portfolios of teachers were properly diversified.
1.3: Objectives of the study.
This specified the intended purpose of the study in terms of general and specific objectives

1.3.1: General objectives
The researcher identified how a teacher investor could develop and maintain an optimal P.F of assets that maximizes his returns on investments subject to risks.

1.3.2: Specific objectives.
The researcher did the following:
i. Identified the various types of investments adopted by secondary school teachers in Mbeere south district hence identified investment opportunities that may have been neglected by teachers in the district.
ii. Identified the investment constraints/risk factors that teachers investments in the district were experiencing in their attempts to maximize returns.
iii. Identified the relationship between risks and returns and how they are measured through application of portfolio theories, CAPM theories, efficient market theories and multifactor theories and how the could be applied to develop an optimal P.F of assets.
iv. Highlighted various ways in which optimal P.F of assets could be maintained by constant monitoring and adoption of risk management strategies in order to minimize risks and maximize returns.

1.4: Research questions
The following research questions were answered:
i. How can a teacher investor in Mbeere South district develop an optimal P.F of assets for investment that maximizes his returns subject risks?
ii. What investment opportunities/sources of returns have teachers in the district adopted?
iii. What investment constraints/risk factors do the secondary school teachers experience in the district in their attempts to maximize returns?
iv. What is the relationship between risks and returns to investment?
v. How can teachers’ returns/risks to investments be measured?
Vi. What risk management strategies could be adopted to minimize risks and maximize returns thus maintaining an Optimal P.F for a teacher investor?

1.5: Significance of the study

The research would help expose the teachers' and other investors to information on the wide range of investment opportunities open to them hence the need to diversify their investments in order to maximize returns and minimize risks. This is possible if investors knew how to measure returns and risks and know the relationship between them. The information obtained would help teachers and other investors to change their focus so that they could think of better ways of attaining higher returns through diversification of investments other than over dependence on the government for pay hikes. This could help reduce mobility of teachers to public and private sectors hence ensuring high retention rates and effective delivery of teachers' services.

The research would help teachers and parents to consider investment on education as an alternative investment which increases chances of upward mobility and higher returns. This would enhance accumulation of human capital and entrepreneurship in line with the Vision 2030 of having an industrialized economy. Development and promotion of entrepreneurial culture among the teachers who are the majority and widely spread throughout the country would help in raising the level of gross domestic product by increasing investment opportunities and promoting job creation.

The research will help teachers and other investors with a means for evaluating their risk per unit of return which can help them decide on which assets or securities to dispose off and which ones to buy in order to maximize their returns. It will also help them know whether they have optimal portfolios by comparing their realized risk per unit of return with those of the average figures for different assets.

The research may help the government realize the imperfections in the labour market due to inefficiency in the market hence help harmonize the wage rates of different sectors of the economy as way of motivating workers, raising their standards of living and ensuring
fairness in distribution of income. This is especially so in the field of education due to increased number of pupils/students with the introduction of free primary education and free tuition as stipulated in Kenyan budget (2010/2011). There’s need to retain and attract more teachers for effective service delivery. The research highlighted the importance of adopting risk management strategies as a way of ensuring increased returns and reducing risks which are an important consideration when developing an optimal portfolio management strategy.

1.6: Limitations of the study
The following were the limitations of the research project:

i. The study was limited to Mbeere south district but was hoped to be a good representative of teachers’ returns to risks issues due to limitation of funds as the researcher was a self-sponsored, school based student. The researcher hoped that the stratified sampling method used gave a good representative data.

ii. Most of the information obtained was descriptive yet the results given need to be analyzed to give statistical data which required time and skills in statistics. Use of computer software programme (S.P.S.S) and some descriptive analysis provided the required information.
CHAPTER TWO

2.0 LITERATURE REVIEW.

2.1: Introduction.

The researcher analyzed various theories and ideas related to risks and returns in order to clearly specify their relationship, identified any gaps left as well showed how this knowledge could be applied to minimize risks, develop and maintain an optimal P.F for a teacher investor. Efficient market hypothesis hold it that the current prices of assets/ securities should reflect their level of risks hence their expected rate of return, Fame and French (1992). This suggests that there is a relationship between the expected rate of return and the level of risk sustained. The higher the risk the higher the expected rate of return subject to an investors risk preference.

According to Markowitz portfolio theory (1952, 1959), CAPM theory by Sharpe (1964), Litner (1965), Mossin (1966), it’s possible to establish an optimal portfolio of assets that will maximize returns and minimize risk subject to an investor’s utility function. This is done by combining risk free assets and risky assets and the operating on a security market line or the capital market line at the point of tangency with the Markowitz efficient frontier if the market is at equilibrium. If the investor is a risk averse his utility curves will be steeper thus settling at a point with lower expected returns and risks compared with a less risk averse investor as explained later in the chapter.

Through proper risk management and portfolio management process the researcher established that an investor is able to maximize his returns through proper asset allocation and constant performance evaluation of his portfolio of assets. This involves selling the undervalued stock (those above the security market line or the capital market line) and buying the overvalued stocks (those below the security market line or capital market line). This decision can be attained using various portfolio performances measures like in the Treyror performance measure, Sharpe’s P.F. performance measures among others as explained later in this chapter; Reilly (2006). The above information could be explained under the following sub headings:
2.2: Investments and expected rate of return on investment.

Investment is the current commitment of dollar (Shilling) for a period of time in the hope of getting a higher return in the future to compensate the investor for the time the funds are committed, the expected inflation and the uncertainty of future payment. According to Brigham and Eharhardt (2005), the investment return is equal to the amount received from an investment less the amount invested. There are various types of investment returns ranging from interests on bonds and other loan able facilities, salaries and wages for investment in human capital, dividends on stocks, capital gains on sale stocks, and profits for Entrepreneurship among others.

Expected rate of return on investment (ER)

\[
ER = \frac{(\text{Amount received from investment} - \text{Amount invested})}{\text{Amount Invested}}
\]

Source: Brigham and Eharhardt (2005:126)

Or \( ER = \frac{\text{End value of investment} - \text{beginning value} + \text{cash flow from investment}}{\text{Beginning value}} \)

The rate of return on investments depends on several factors such as the size of the firm, the timing of cash flows/returns and the riskiness of the cash flows due to uncertainty about the future among others as explained later in the chapter. The income that individuals /firms get is either consumed (used) or saved. When income is less than the amount consumed an investor has to borrow and when consumption is less than individuals disposable income investors save. Those savings are later used by individuals and firms for investments. In general individuals are net savers while firms are net investors.

Investors require returns to compensate them for postponing current consumption in times of certainty (RFR), for loss in purchasing power due inflation, (Nominal risk free rate of returns) and fluctuations in future cash inflows due to uncertainty about the future. When measuring returns from historical records one could consider assets on stand alone basis or as a P.F of assets. The expected rate of return on an individual asset them, could be calculated using the formula:

\[
\text{Average annual rate of return period } t (r_t) = \frac{\sum_{i=1}^{n} r_t}{n}
\]
Where $\bar{r}$ is the summation of realized rates for return for different periods divided by the number of years in the holding period concerned.

Portfolio average annual rate of return =

$$r_{\text{Aug}} = \frac{1}{n} \sum_{i=1}^{n} r_i$$

i.e. Sum of average annual rates of return per year divided by the number of years in question.

Source: Brigham and Eharhardt (2005)

The researcher established that an investor can diversify return by investing in different categories of assets such as real assets/fixed (like land, buildings and other physical assets), derivatives (like the future and forward contracts whose value depend on the value of underlying assets) and securities like bonds, treasury bills and stocks among others. One could thus invest in direct investments into actual acquisition of assets or indirect investments like in savings (to earn interest), investment of funds saved in form of assets that yield returns by investing in mutual funds.

The amount that an individual investor invests in assets depends on their financial status (the more one has to move he’s/she is likely to invest), the age (where middle age persons are net savers while the aged are net consumers), the individual’s future plans and needs and one’s risk preference as explained later (under theoretical framework). There are several sources of investment funds including savings from income funds, borrowing from financial institutions and other money lenders, grants from government and as well reinvestment of returns earned from investment.

2.3: Types of risks and how they are measured.

Risk is uncertainty or chance of not meeting investment goals over time for example “varying dividends, missed interest payment or unoccupied rented housing” among others. Reilly and Norton (2006: 32-33), According to the above risks can broadly be classified into
Asset specific/ Unsystematic /diversifiable risks which are unique to the assets characteristics themselves like poor management of firm that issued them, labor strikes among others. These can be eliminated if the asset is completely diversified. The undiversifiable/systematic risks are caused by macro economic factors beyond the level of the firm and cannot be diversified. They are measured by measures of dispersion such standard deviation, variance, coefficient of variation Beta coefficient as explained under theoretical framework.

Risks were classified using a different category into business risk (which arises due to the nature of business), financial risk (due to uncertainty caused by the way a firm finances its business), and liquidity risk (due to inability to sell the asset at fair market value) among others. Historical risk investment can be measured on stand alone bases using the following formula to measure variance, standard deviation or coefficient of variation among others.

\[
\text{Variance} = \sigma^2 = \sum \frac{(R_t - \bar{R}_t)^2}{n - 1}
\]

Where \( \sigma^2 \) is summation of squared deviations of return \( R_t \) over period \( t \) over arithmetic mean returns \( \bar{R}_t \) over same period divided by \( n - 1 \) where \( n \) is the number of years in question.

Standard Deviation \( \sigma = \sqrt{\sigma^2} \)

While coefficient of variation \( C.V = \frac{\sigma}{\bar{R}_t} \)

The higher the variance, standard deviation or co-efficient of variation the higher the risk.

The risk of a portfolio obtained from historical data of a sample can be measured using the formula as explained in the previous page:

\[
\text{Estimated } \sigma = \frac{1}{n-1} \sum \left( \frac{r_t - \bar{r}_{t-1}}{n} \right)
\]

Where \( r_t \) = is the sum of historical realized returns for each period \( t \) divided by the number of years. \( (n) - 1 \)

\[
\bar{r}_t = \frac{1}{n} \sum_{i=t}^{n} (r_i) = \text{the average annual rate of return for each year} = \text{summation of realized returns for the holding period.}
\]
The average annual rates of return for the whole holding period obtained from summation of returns divided by n - 1.

The riskiness for any two assets i, j can be estimated using the standardized covariance between returns two the risky assets (correlation coefficient $C_{i,j}$)

$$C_{i,j} = \frac{\text{Cov}_{i,j}}{\sigma_i \sigma_j}$$

$\text{Cov}_{i,j}$ is the covariance between asset i, returns and those of asset j measuring whether there is linear relationship between their returns. $C_{i,j}$ is the correlation coefficient that measures this degree of linearity. It's value ranges from (+1) for perfectly positive linear relationship to negative one for a perfectly negative linear relationship to zero if there is no relationship. $\sigma_i, \sigma_j$ are the standard deviations of returns for the two risky assets I and j respectively.


2.4: Relationship between risks and returns in construction of optimal portfolio of assets.

In a completely diversified portfolio which is mean variance efficient the relationship between risks and returns can be expressed in terms of risk free rate of return (RFR) and market risk premium [market return (Rm) - RFR] and the individual asset beta ($b_i$) as follows: Required rate of return on an asset

$$R_i = \text{RFR} + (R_m - \text{RFR}) b_i.$$ 

$\beta_i$ is the slope for the security market line SML.

When a graph for expected rate of return verses risk measured by standard deviation for a portfolio is drawn a capital market line is formed with a slope equal the market risk premium (ERm – RFR) divided by the standard deviation of the market which describes the best price of a given level of risk at equilibrium. Portfolio expected return $ER_{port} = \text{RFR} + (ER_m - \text{RFR})/6$. Ehrhardt, (2005).
2.5: Theoretical Literature.

2.5.1: Markowitz Portfolio Model.

This model was developed by Harry Markowitz (1952, 1959). His major contribution was that of showing the relationship between risks and returns unlike earlier research that treated the two separately. He showed that the expected risk measure of returns was the variance of expected returns by assuming that Investors seek to maximize one period expected utility subject to diminishing marginal utility, estimating their portfolio risks on the basis of variability of portfolios return i.e. variance or standard deviation of returns only. He also assumed that investment alternatives are represented by distribution of expected returns over some holding period and that Investors base decisions on expected returns and risks. For all levels of risks, investors prefer higher returns to lower returns given the level of risk or given the level of expected rate of return they prefer lower risks than higher risks.

According to this theory, the expected return to a portfolio is the weighted average of expected return for individual investment in the portfolio.

\[
\begin{align*}
ER_{(\text{port})} &= \sum_{i=1}^{n} W_i R_i \\
W_i &= \text{weight of individual assets in the portfolio} \\
R_i &= \text{the expected rate of return for asset } i
\end{align*}
\]

Source: Ross Etal (2001:332)

Standard deviation of a portfolio is the covariance of between the rates of return for all the pairs of assets in the portfolio as shown below. Covariance of return is the degree to which returns of the asset and another asset move together relative to their individual mean values over time.

\[
\text{Cov}_{ij} = \sum [(R_i - ER_i) (R_j - ER_j)]
\]

For actual data but for sample data results are divided by \(n - 1\) rather than \(n\) to reduce errors.

\[
\text{Cov}_{ij} = \text{covariance of rates of returns for assets } i \text{ and } j.
\]

\[
(R_i - ER_i) = \text{difference between rates of returns to asset } R_i \text{ and expected returns asset } R_i.
\]

\[
R_i - E(R_j) = \text{Difference between rates of return to asset } R_i \text{ and expected returns to asset } R_j.
\]
A diagram showing how efficient frontier is derived

ER Port

\[ \text{The slope of the efficient frontier} = \frac{\text{Change in ER}_\text{port}}{\text{Change in 6port}} \]

Source: Reilly (2006)

Asset A is superior to asset C as it has less risk for any for give level of return \( R_o \) while B is superior to C as it has higher expected return to \( R_x \) Which is higher than \( (R_o) \). The exact point where an individual chooses on the efficient frontier depends on the individual investors risk preference and hence choice of point of tangency between the efficient frontier and their highest utility curve as shown next page.
Diagram showing how to select optimal P.F of assets.

A risk averter investor will have steep utility curves and will settle at point A with lower returns and less risks at the point of tangency of their utility curves and the efficient frontier. An investor who is more optimistic will have gentle utility curves; he’s willing to take higher risks hence higher returns as reflected at point B on the diagram above. Markowitz formed a basis upon which latter capital market theories like CAMP are based.

2.5.2: Capital Market Theory.
The theory is an expansion of Markowitz portfolio theory and was developed by William Sharpe (1964), Litner (1965) and Mossin (1966) hence Sharpe-Litner-Mossin (SLM) model who derived their theories independently. Its special contribution was that of the risk free rate of return to assets in which the correlation and the covariance of any asset is zero. Any combinations of asset and risk free asset generate a linear return to risk function. Combination of risk free rates of return and Markowitz efficient frontier results is a straight line portfolio possibility this theory is based on the assumptions that Investors target points of efficient frontier depending on individual investors risk/return utility function having homogenous expectations thus having identical probability distribution for future returns. Investors are assumed to have one period time horizon having the ability to borrow or lend any amount as
risk free rate of return. All investments are assumed to be divisible with the capital market being at equilibrium (that means that investments are valued in line with their risk levels). The theory also assumes that there are no taxes or transaction costs in buying and selling securities nor inflation or change in interest rates or if there is it can be fully anticipated.

According to this theory an investor combines the risk free assets and risky assets on efficient frontier to derive a set of straight line portfolio possibilities. The line that enables investors to maximize returns is one that is target to the efficient frontier known as the capital market line as shown and all investors’ targets points on this line depending on their risk preferences.

**Diagram showing how an investor combines risk assets and risk free assets in his portfolio.**

![Diagram showing how an investor combines risk assets and risk free assets in his portfolio.](image)

Source: Researcher

All investors target the point of tangency when investing on the risky P.F. This P.F is known as market P.F but individual investor can choose any point depending on their risk preferences. Investors can borrow or lend to settle at their point of preference. The market portfolio dominates all other as reflected by the CML line therefore the relevant measure of risk assets is the covariance any portfolio or any asset with the market portfolio which it’s the systematic risk of investment; that is the risk that cannot be diversified away as it is caused by factors beyond the uniqueness of the asset itself (caused by macro economic factors).
variable that affects all other assets). When the covariance of the individual risky assets with that of the market ($COV_{i, m}$) is standardized (by dividing it with the market variance $6^2m$) we get beta $B_i$ which is standardized measure of the risk.

Standardized measure of risk ($b_i$) = $\beta = \frac{COV_i, M}{\sigma^2_m}$

A security market line (SML) can be derived mapping the expected or required rate of return for an asset or P.F to its beta. All individual securities and portfolios should plot on this line because the expected return on assets should be based on its systematic risk ($\beta$).

Equation for security market line is:

$$E(R_i) = R_{FR} + \beta_i (R_m - R_{FR})$$

If the security market is market efficient it's possible to determine the undervalued stocks (those that lie above the SML line whose estimated value is above the required rate of return). Overvalued securities (those that lie below the SML line) whose estimated return lie below their required rate of return as shown below.

A diagram showing overvalued and undervalued stocks

Source: Ross (2001:328)
It is important to note that the covariance of market portfolio return with itself is its variance \( \text{COV}_{m} \), \( m/6^2m = 1 \) therefore the Beta for a diversified market portfolio is equal to one. In order to accept the risky assets with the higher Beta, the investors will have to be compensated by earning higher returns, then those of the diversified markets but because the market is at the equilibrium, efficient buying and selling of securities lead the market to settle on the SML line. The systematic risk variable (Beta) for an individual risky asset can be derived using a line of best fit (regression equation) generated using the asset characteristic line.

Where

\[
R_{it} = \beta_i + b_i R_{m} + E
\]

Where \( R_{it} \) is the required rate of return for asset \( i \) during period \( t \)

\( \beta_i = \) is the constant term or intercept of the regression

\[ \beta_i = R_i - b_i R_m \]

\( \beta_i \) = the systematic risk Beta of Asset \( i \)= \( \text{COV}_{i, m}/6^2m \)

\( E \) = is the random error term.

The CAPM has been criticized because of some of its assumptions which do not seem realistic such as the ability to borrow or lend any amounts at risk free rate of return, a capital market that is efficient (at equilibrium) with no taxes or transactional costs, no inflation or change in interest rates or if there is it can be estimated in advance, the Asset beta is not stable over time.

### 2.6: Empirical Literature

Empirical studies by other researchers have it that the CAPM Theory assumptions can be relaxed leaving the model a useful model as far as capital markets is concerned. Empirical studies by Reilly and Wright (1988) analyzed effects of returns on market indexes and time intervals and showed the major cause of difference in beta is use of monthly returns versus weekly returns. Empirical studies also have shown that the impact of time interval on return differs depending on the sizes of the firm in that larger firms tend to have large betas while small firms tend to have smaller betas. Average betas for small firms using monthly data was 1.682 while that of small firms using weekly data was 1.82. This problem can be solved by considering annual rates of returns or considering a long time of interval of returns.
Assumptions that investors can borrow and lend at risk free rate of return is true for government securities like treasury bills but it's questionable if the investors can borrow unlimited amounts at this rate. However, investors can still borrow at a higher rate than risk free rate and invest to earn higher return thus operating at a higher line while still targeting the efficient frontiers but with an intercept higher than RFR as shown below:

A diagram for investors borrowing at a higher rate than (RFR)

\[ R_B > \text{RFR} \]

Investors operate at curve RFR-ABC.

Source: Reilly (2006)

Assumptions that there are no transactions cost so that investors can buy or sell mispriced securities to plot at SML line. May not hold as the transaction costs may discourage investors from buying and selling mispriced securities as the costs derived would drive away the benefits attained. Therefore an investor may map close to SML but not on it. Other researchers like Brennan and Subramanya (1996) hold it that additional cost of diversification drives away benefits mainly due to monitoring costs and costs of analyzing additional securities.
CAMP is a one period model corresponding to the planning of individual investors but in real sense investors have heterogeneous expectations and planning periods but if all investors had similar information and background the above assumptions can be relaxed without a lot of impact. Investors have different tax burdens however for some institutions like pension funds, charitable organizations and Christian organizations the assumption is true. However taxes have a lot of impact on capital gains and dividends among other returns.

It's difficult to have a market policy that is the mean variance efficient because market indexes used don't contain all the risky assets in the market. This can lead to benchmark error cost leading to inappropriate systematic risk and getting a wrong security line due to undervalued betas. S and P 500 index gives a better market policy than other proxies internationally but it may not contain securities traded in all countries like Kenya.

Research has shown that other factors other also influence the rate of returns for securities such as size of the firm, earnings price (E/P) ratio, book to market value ratio financial leverage among others for example Research by Fame and French (1963-1990) showed that the above factors have a lot of impact leading them to develop a three factor CAPM model (Fame and French. 1996). In conclusion, CAPM model gave an important contribution to the capital market theories by bringing in the idea of risk free asset hence (RFR) in additional to return to risky assets in valuation of asset return thus enabling the computation of beta as a measure of systematic risk in an efficient capital market. It also helps in valuing stock.

2.6.1: Efficient Capital Markets Hypothesis

An efficient capital market is one in which security prices adjust rapidly to new information such that current prices reflect all information about the security. Several researches have been done to check whether capital markets are really efficient as this impact on the decisions that investors make as well as portfolio managers. Earlier researches were based on random walk hypothesis that stock price changes occur rapidly.

Assumptions of efficient capital market include assumptions that there are large numbers of profit maximizing participants who analyses and value securities independently and that new information regarding securities comes to the market in a random fashion while the timing of
an announcement is independent of others. Profit maximizing investors adjust to security prices rapidly to reflect the effects of new information. This mean price changes are independent and random and fast making the market efficient. Securities adjust to new information thus security prices reflect all information that is publicly available at any new point in time including information on risks of owning the security. Thus the “expected returns implicit in the current price of the security should reflect its level of risk” Reilly and Brown (2006). This means that investors who buy at informational efficient prices should receive a rate of return that is consistent with the perceived risk of the stock, in line with CAPM theory that all stocks should map on the SML so that their expected level of price is in line with their perceived risk.

Fames (1970, 1991) made the efficient market theory become more formalized such that current market prices were expected to reflect all available information regarding the security and the expected return for securities is consistent with assets level of risk. He came up with three sub hypotheses:

Weak form efficient market Hypothesis: which assumes that current stock prices reflect all market information in the past about prices, rates of return, trading data among others thus no gain can be attained by investors by using historical market data hence no effect on future rates of return.

Semi strong efficient market hypothesis; asserts that security prices respond rapidly to all public information hence no investor can benefit by basing his investment decisions on basis of publicly available information as this is reflected in current market prices. This is supported by the fact that the economic events like stock splits, initial public offers, world events and economic news have an impact on current market prices for a short period of time. However other researches show that Investors can use public information to make above average returns from trading due to inefficiency in market information as reflected in unexpected earning of stocks, differential returns depending on firms sizes, changes in price earnings ratios, abnormality in markets such as the January effects, Monday effects among others.
Strong form efficient market hypothesis: assumes that stock prices reflect all available information both public and private thus no investor can gain above average returns by using private information as its reflected in market price and all have access to information. This hypothesis has been criticized because some investor groups may have private information unavailable in the market such as the corporate insiders who prepare monthly returns on transactions in the SEC and Van Katesh (1995) has it that corporate insiders consistently earn above average due to access to private information before it can be released to the market. This includes Stock Exchange specialists and security analysts as well as professional managers who can analyze the market situation, acquire information which other investors may not access. However, there are times when investors in mutual funds and endowment funds though based in expert information yield inferior returns supporting EMH. With superior analytical techniques of analyzing market information being available it’s reflected in the current market prices hence a signaling effect on the action the investors should take and that security prices should reflect the expected returns and level of risks sustained.

2.6.2: Multifactor model of risk and return

Due to limitations of Markowitz theory and capital asset pricing models explained in the previous literature, several multifactor models have been formulated as the single risk factor (beta) fails to account for all the volatility in individual securities or portfolios of securities. This includes;

i. The Arbitrage Pricing Theory APT

This was developed by Ross Stephen (1976, 1977) to solve the problem of instability of betas for individual security assets over time and its inability to account for all the risks as specified by CAPM. The linear relationship between rates of return and systematic risks was also questioned hence the need to get more risk variables or develop risk proxies. This can be supported by Fame and French (1992) EMH who demonstrated that a firm with high book to market ratios had higher risk adjusted returns than those with low book to market ratios hence markets are not efficient or if so prices do not signal all information in the market. The arbitrage pricing theory assumed that Capital markets are perfectly competitive and that
Investors prefer more wealth that less wealth with certainty. It's also assumed that the stochastic process of generating asset return can be expressed as a linear function of a set of risk factors (indexes).

\[ R_i = E(R_i) + b_{11} \bar{\epsilon}_1 + b_{12} \bar{\epsilon}_2 + \ldots + b_{ik} \bar{\epsilon}_k + \epsilon_i \] for \( i = 1 \) to \( n \)

Where

- \( R_i \) = the actual return an asset \( i \) during a specified time period \( i = 1, 2, 3, \ldots n \).
- \( E(R_i) \) = the expected return for asset \( i \) if all risk factors have zero changes.
- \( b_{ij} \) = the reaction in asset \( i \)'s return to movements in a common risk factor \( j \).
- \( \bar{\epsilon}_k \) = a set of common factors or indexes with zero mean that influences the return on all assets.
- \( \epsilon_i \) = a unique effect on asset \( i \)'s return (i.e., a random error that by assumption is completely diversified in large portfolios and has a mean of zero).
- \( n \) = the number of assets.

\( \bar{\epsilon} \) are multiple risk factors that affect returns to all assets, such as inflation, growth in GDP, major political upheavals, changes in interest rates, unemployment rates, and exchange rates among others. This is different from CAPM view that the only relevant risk factor is the covariance of asset with the market portfolio (beta). The impact of each of the common risk factors will vary depending on the asset in question. Empirical studies on APT showed about 3, 4 or five factors affect security returns but did not specify them or their magnitude. Like CAPM, APT's Error term (\( \epsilon \)) can be diversified away in large portfolios. It's possible to have return on zero investment, zero systematic risk after diversifying the unique Error term away.

Expected return on asset = \( E(R_i) = \lambda_0 + \lambda_1 b_{i1} + \lambda_2 b_{i2} + \ldots + \lambda_k b_{ik} \)

- \( \lambda_0 \) = is the expected return on asset with zero systematic risk.
- \( \lambda_j \) = the risk premium related to \( j \)th common factor.
- \( b_{ij} \) = the pricing relationship between the risk premium and asset or the responsiveness of asset \( i \) to the \( j \)th common factor.

The theory like CAPM specifies linear model based on fact that investor is compensated for committing their capital and bearing risks. APT shows a connection of risk and expected return (\( R \)). Inform of a "security plane with \((k+1)\) dimension (K risk factors and one additional dimension for security expected return)" (Reilly and Brown, 2006).
One can take advantage of arbitrage by purchasing the undervalued stocks, selling the overvalued stocks. Critiques of APT like Shaken (1982, 1985) said that it cannot be empirically verified and that the K factor model does not explain the returns as expected. It's not testable just like other arbitrage theories.

**Other multifactor models**

These assume there are several risk factors. In order to develop a model, the following steps are involved. Develop a security or portfolio characteristic line (regression line using simple market model)

\[ R_{it} = a_i + b_i m_t + e_t \]

Or subtract RFR from period t from Ri and the market return get excess returns forms.

\[ (R_{it} - R_{it}) = \hat{a}_i + b_i (R_{mt} - R_{it}) + e_{it} \]

The investor chooses the exact number and identify of risk factors in the following equation.

\[ R_{it} = a_i + [b_1, F_{it} + b_{12}F_{2t} + \ldots + b_{ik}k_t] + e_{it} \]

Where \( F_{it} \) is the period t designated risk factor

\( R_{it} \) can be measured as shown above.

Multifactor Models Bridge the gap between theory and practice by identifying the variables that exposes assets to systematic risks in the market. According to these theories risks are caused by macro economic and micro-Economic risk variables that are unique to assets characteristics such as size of the firm, leverage levels among other firm’s economic ratios.

Another multifactor model was developed by Burmeister.E etal (1994a). They came up with five risk exposures; Confidence risks due to unanticipated changes in investors willingness to take risk, time horizon risk due to unanticipated desires to receive pay outs, inflation risk based on a combination of unanticipated components of short term and long term inflation rates, business cycle risk due to unanticipated changes in overall business activity and Market timing risk or part of standard and Poor's 500 total returns that is not explained by the four macro economic variables.
They estimated the following risk premiums using the 1st quarter of 1992

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Risk Premiums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence</td>
<td>2.59%</td>
</tr>
<tr>
<td>Time horizon</td>
<td>-0.66%</td>
</tr>
<tr>
<td>Inflation</td>
<td>-4.32%</td>
</tr>
<tr>
<td>Business cycle</td>
<td>1.49%</td>
</tr>
<tr>
<td>Market timing</td>
<td>3.61%</td>
</tr>
</tbody>
</table>

Fame F.K and French K R (1993) developed a micro based risk factor model shown below

Fame and French (1993, no1:3-56)

\[ (R_t - R_{FR}) = \beta_i + b_{11} (R_m - R_{FR}) + b_{12} SMB_t + b_{13} HML_t + \epsilon_{it} \]

Where

SMB represents (small minus big) is the return to a P.F of small capitalization stock less return to a portfolio P.F of large capitalization stocks hence getting the risk associated with size of firm.

HML= high minus low return to a portfolio of high ration of book to market value less the return to portfolio of low book to market value. Captures differences in return associated with growth.

The model is credited for its flexibility due to ability to modify it to suit different market conditions. It has fewer assumptions compared to CAPM model. However, further research should be done to develop a model that gives the exact number of risk in a portfolio and the magnitude of each risk factor required to develop a dynamic model that will stand the test of time.

2.7. Gaps filled by the study

The researcher intended to fill the gap identified by Landsburge. (2005) as to whether the prices of goods and services reflect their marginal costs by shifting the attention of investors especially teachers from what they earn from an investment to what they can retain from it. (Reilly and Norton, 2006) Most of the multifactor models developed to correct the limitations of earlier risk/return models failed to state the exact number and the magnitude of impact of each risk factor that affects return on investment. The researcher looked into the
relationship between risks and returns from individual investors perspective and illustrated how a teacher investor can develop and maintain an optimal P.F that minimizes risk thus maximizing returns unlike most of the researchers who research on firms and individual investors in general for example Teresia (2003) who researched on challenges facing service industry a case of cyber caves in Nairobi, Kibuthu (2003) researched on Impact of interest rates volatility on borrowing from commercial banks 1997-2004 among others.
2.8 Conceptual framework

Procedure involved in development and management of an optimal portfolio of assets for an investor

Risk minimization → Optimal P.F

1. Policy Formulation/Planning.
   Formulate investment objectives in line with investors risk preference by identifying investment opportunities/sources of return available to a teachers investors in the district and investment constraints faced such as funds availability, legal and regulatory factors among others need to be considered.

2. Situational analysis/Identification of risk factors
   Identify the various risk factors that affect investor’s rate of return on investment. This includes financial risks, business risks and liquidity risks which can be classified into systematic risks (caused by factors like beta, political/economic changes, level of inflation), and unsystematic risks (asset/firm specific factors like size/nature of the business) by carrying out a SWOT analysis. This includes the investment constraint.

3. Identify an investment strategy that incorporates investor’s investment objective and risk management strategies in order to construct an optimal P.F that minimize risks and maximize returns after identifying risk/return relationship.

4. Control/monitoring of P.F. Develop a feedback loop through constant monitoring of the portfolio created in order to ensure maximum returns at minimized risks.

Source: Researcher
From the literature review and the theoretical framework, asset / portfolio returns are a function of the assets / portfolio's risks because in an efficient market hypothesis, the current price of an asset / portfolio should reflect its risk level. From the Markowitz portfolio theory and CAPM theory, the return to an efficient market portfolio is a function of the risk-free rates in the market and the market risk premium and the assets' systematic risk (beta).

\[ E(R_i) = RFR + (R_m - RFR) \beta_i \]

Where \( E(R_i) \) is the expected return of the asset

\( RFR \) is the risk-free rate of return.

\( (R_m - RFR) \) is the market risk premium.

\( \beta_i \) = the asset beta which is its systematic risk given by covariance of the return to asset \( i \) and market returns divided by the market variance \( (\sigma_m^2) \)

\[ \beta_i = \frac{\text{Cov}(i, m)}{\sigma_m^2} \]

which is the slope of the security market line.

The risk-free rate \( RFR \) depends on:

The real risk-free rate return that compensates investors for postponing present consumption for a future return if there is no inflation or uncertainty. It’s the return to risk of losing the purchasing power due to unanticipated inflation. Real risk-free rate of return is influenced by investor’s time preference for consumption and real growth rate in the long run for the economy. Reilly et al. (2006).

The nominal risk-free rate takes into account the effects of inflation which increases the risk to return, real rate of interests influencing peoples’ saving habits among other factors and Changes in the capital markets (monetary environment/ relative easy or tightness of the capital market). The government fiscal policies like taxation affect equilibrium in the capital market for example if the government expenditure increases, civil servants incomes, increasing savings thus availing funds for investment. Changes in individual investors risk preferences cause’s changes in the slope SML while changes in inflation, real growth rate changes and changes in market situation causes a shift in the SML line.
Other factors that influence asset or portfolio rates of return include the following:

1. Size of the firm. According to (Arbel. and Strebel, 1983) inefficiency in the market cause large firms to have their stocks reflecting the information available while small firms are neglected due to lack of information and limited institution interest. Relationship between return and market value of common stocks and show that small firms had higher risk adjusted returns than big firms.

Book to market value ratio. Fame and French (1992) Asset pricing theory on examined the effect of market beta, size, earning per share ratio, leverage ratio and found the following: A positive relationship between an asset and portfolios systematic risk beta and its earnings. They saw that there is a negative relationship between size of the firm and its average return. There was a positive relationship between book to market value of a firm and the future returns to the stock. High leverage increases liquidity risk and business risk increasing the investors required rate of return

According to semi-strong efficient market hypothesis by Fame and French (1992) abnormal returns may be expected due to major changes in political and economic events e.g. stock splits which reduces prices of stocks, political upheavals leading to losses. PEG ratio = Price Earning Growth rate ratio. There is an inverse relationship between PEG ratio and future returns because firms with low PEG ratio have above average rates of return because they are expected to grow hence investors are willing to accept low rates of return. This is supported by Donald (1991). Other macro environmental factors such as changes in legal systems, political Upheavals among others influence returns.
CHAPTER THREE

3.0: RESEARCH METHODOLOGY.

3.1: Introduction
The researcher carried out a descriptive study in order to identify the various investment opportunities open to the teachers within the district and the various risks that their investments face. She found out that teachers are able to maximize their returns from investments through diversification and proper management of risks by comparing their portfolio rates of return and P.F standard deviations with those of their respective average figures as explained in chapter I and II. This would help the investor identify investments that maximize his returns subject to his risk preference. The researcher gathered additional secondary data on various theories related to investment, risk /return relationship and how they could be measured. Primary data on secondary teachers’ returns and investment portfolios as well as risks faced, was acquired using stratified sampling of Forty(40) out of three hundred and ten (310) secondary school teachers in Mbeere South District for later analysis and interpretation using a computer software, a Statistical Package for social Sciences (S.P.S.S) among others. This was an adequate sample of 12.9% which is greater than than10% of the recommended sample of a population of over three hundred.Mugenda and Mugenda (1999).

3.2: Research design
The researcher carried out a descriptive research in order to obtain qualitative data which could be used by teachers to help them come up with efficient portfolios that maximize returns instead of depending so much on salary hikes. It may also motivate the teachers to develop themselves through further investments in human capital as an alternative investment. Information on how they could measure their risk would help them in trading their assets and acquiring new assets in the future in order to minimize risks and maximize their returns. The above required gathering of secondary information on risk/return relationship for use in computing P.F risk / standard deviation and P.F rates of return. The primary data on portfolios held by teachers and estimates of returns and risks was obtained
using stratified sampling of forty teachers in sixteen out of the thirty five secondary schools in Mbeere South District with a population of three hundred and ten secondary school teachers. Stratified sampling would helped in giving a better representation of teachers in the district. Jankwicz (2005)

3.3: Target population
Mbeere South district is a newly created district with four divisions namely Gachoka, Kiritiri, Mwea and Kiambere divisions. It has a population of three hundred and ten secondary school teachers teaching in different categories of secondary schools ranging from provincial to district and private schools, day/boarding, mixed versus boys and girls schools. The researcher targeted population was three hundred and ten secondary school teachers who represent the elite in the community hence imparting a lot on it by the nature of their profession. Teachers are the most spread civil servants hence if encouraged to invest would promote entrepreneurial culture and job creation in the market thus reducing unemployment.

3.4: Sample design procedures
As explained above, the researcher used stratified sampling to cater for the varying characteristics of teachers in the district ranging from those working in provincial schools to those working in newly established day schools and private schools (Schindler and Coopers, 2003). A Sample of forty out of the one hundred and sixty teachers (sample proportion of 0.25% of teachers in the sampled schools) in the district was selected from sixteen out of the thirty five schools in the four divisions in the district. A table showing the categories of sample schools selected and the sample size for teachers’ respondents versus the population size is available under Appendix III.

3.5: Data collection procedures.
The researcher used observation and questionnaires to obtain information from the population. Due to time factor, the researcher used a research assistant to help distribute and gather questionnaires. A brief introduction and assurance that the information obtained was purely for research purpose helped elicit positive responses from the teachers thus obtaining a good feedback on the questionnaires availed. Observation helped gather additional on the
working environment of teachers. Secondary data provided information on how P.F risks/ P.F average returns and those of individual investors could be computed for the years 2008 /2009 using the primary data obtained. Use of a research assistant and frequent communication over the mobile phone by the researcher to her respondents helped gather the required information on time.

3.6: Piloting or pre-testing of questionnaires.
The researcher carried out pre testing of questionnaires on three schools that is St. Clare Girls, Ngenge Secondary and Karwigi Secondary schools making six point nine percent (16.9%) of the planned sample size. This helped the researcher identify the clarity/reliability and validity of questionnaires before administering them to the other sampled respondents. The necessary amendments were made before issuing to the other respondents.

3.7: Data collection.
The secondary information collected from reference books, journals multi media, among others helped identify risk/ return relationship and how the two could be measured. The primary data obtained by use of questionnaires on the sampled population was analyzed using computer software programme (S.P.S.S) to calculate average annual rates of return and standard deviation for different portfolios and assets which were later used to assert the extent of risk .Risk per unit of return /coefficient of variation (C.V) was calculated to gauge the risk ness of assets. The higher the standard deviation and (C.V), the higher the risk and the higher the expected rate of return. This helped in identifying whether portfolio or assets held by teachers were superior or inferior to average ones and whether their portfolios were properly diversified.

Descriptive analysis of information obtained from the primary data would help in identifying investment opportunities utilized by a majority of the teachers and what investment opportunities have been neglected. This was obtained when the weights in terms of amounts spent in various investments are presented in form of a charts the investment with the highest response rate would represent the most preferred investment with the lowest one representing the Investments in neglected areas .Risk management and risk reduction
strategies if properly utilized could help investors maximize their returns by using the secondary data obtained from the research.

Information on constraints to investments and risk management obtained from secondary data and primary data obtained may motivate teachers to maximize their returns, minimize their risks, and raise human capital and teachers standards of living. This would encourage entrepreneurial culture; create more job opportunities raising the level of economic growth and development in line with vision 2030 of having an industrialized Kenyan economy. The research recommendations that may help the government to come up with better method of rewarding human capital to avoid brain drain with the recent developments in the East African Community (E. A.C.).
CHAPTER FOUR

4.0 DATA ANALYSIS AND PRESENTATION

4.1.0: Introduction

This chapter aims at presenting the primary collected using questionnaires and secondary data obtained and analyzing it in line with the objectives of the study. This was done using computer software programme (S.P.S.S.). It is important to note that thirty eight out of the intended forty respondents responded positively, response rate of ninety five percent (95%).

4.2.0: Response rate.

Table 4.1.0: Response rate

<table>
<thead>
<tr>
<th>Type of income</th>
<th>No. of respondents Year 2008</th>
<th>No. of respondents Year 2009</th>
<th>Response rate Year 2008 (%)</th>
<th>Response rate Year 2009 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>38</td>
<td>38</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Land sales/farming</td>
<td>20</td>
<td>22</td>
<td>52.6</td>
<td>57.9</td>
</tr>
<tr>
<td>Fixed assets</td>
<td>5</td>
<td>7</td>
<td>13.2</td>
<td>18.4</td>
</tr>
<tr>
<td>Securities</td>
<td>23</td>
<td>23</td>
<td>60.5</td>
<td>60.5</td>
</tr>
<tr>
<td>Business profit</td>
<td>4</td>
<td>4</td>
<td>10.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>
4.3.0: Sources of returns/Investment opportunities utilized by teachers in Mbeere South district

Table 2.0: Sources of returns/Investment opportunities utilized by teachers in Mbeere South district

<table>
<thead>
<tr>
<th>Type of income</th>
<th>Average amount Year 2008</th>
<th>Average amount Year 2009</th>
<th>Standard Deviation Year 2008</th>
<th>Standard Deviation Year 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>322500</td>
<td>345608</td>
<td>201246</td>
<td>210997</td>
</tr>
<tr>
<td>Land sales/Farming</td>
<td>13828</td>
<td>17250</td>
<td>14948</td>
<td>17846</td>
</tr>
<tr>
<td>Fixed assets</td>
<td>27400</td>
<td>25857</td>
<td>41144</td>
<td>42286</td>
</tr>
<tr>
<td>Income from securities</td>
<td>13050</td>
<td>16169</td>
<td>15304</td>
<td>17164</td>
</tr>
<tr>
<td>Business profit</td>
<td>57500</td>
<td>78000</td>
<td>42720</td>
<td>0</td>
</tr>
</tbody>
</table>

The success of any business organization to a large extent depends on efficient management of its financial resources. The financial managers must determine the amount of funds required, their sources, how best to utilize and control the finances in order to achieve the goals of the organization. From the primary data various investment opportunities were identified. 100% of the sampled population had invested in education but only 25% of them
had gone for upgrading courses. Most of them had invested in educating their siblings and children which is vital for accumulation of human capital.

There was a general rise in average amount of salary income from shillings three hundred and twenty two thousands, five hundred only to three hundred and fourth five thousands six hundred and eight. Their standard deviation and those of the other sources of income are shown on table 2.0. On average investment in securities had the lowest risks for the two years as reflected by their standard deviation. 52.6% year 2008 and 57.9% year 2009 of the sampled population had invested in purchase of land, farming and agro based activities which earned low returns due to the semi-arid nature of the district and the fact that it was difficult to assess the risk factors in advance. The high percentage of investment in the area was due to the fact that the value of land appreciates with time.

Investment in real assets/ fixed assets amounted to thirteen point two five percent (13.25%) year 2008 and (18.4%) year 2009 of the return on capital. sixty point five percent (60.5%) of the sampled teachers had invested in shares of SACCOS year 2008/2009 where the returns tend to be low but more reliable. Very few had invested in shares of companies as the returns tend to be low. Investments in small scale businesses like shops and matatus was(10.5%) as some businesses had closed down due to making of perpetual losses, the main cause being lack of reliable/ honesty workers such that the expenditure ended up being more than the returns. None of the teacher investors had invested in future options or forward contracts or on bonds. There is a need to diversify the investment as 50% of the sampled population had invested in only two key areas of investment that is education and farming. Only ten point five percent (10.5%) of the sampled population had invested in at least four of the categories of investments specified.
### 4.4.0: Investment constraints/ Challenges to teacher’s investment

#### Table 3.0: Investment constraints/ Challenges to teacher’s investment

<table>
<thead>
<tr>
<th>Type of investment constraint</th>
<th>No. of respondents</th>
<th>Response rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of adequate funds</td>
<td>38</td>
<td>100</td>
</tr>
<tr>
<td>Unfavorable social political/natural factors/uncertainty</td>
<td>15</td>
<td>39.5</td>
</tr>
<tr>
<td>Lack of: time/reliable and affordable workers/control</td>
<td>24</td>
<td>63</td>
</tr>
<tr>
<td>Inability to identify best investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business failure</td>
<td>4</td>
<td>10.5</td>
</tr>
<tr>
<td>Discouragement from peers/lack of role models</td>
<td>8</td>
<td>21.1</td>
</tr>
<tr>
<td>Inflation/high cost of living</td>
<td>32</td>
<td>84.2</td>
</tr>
<tr>
<td>Lack of market/competition</td>
<td>18</td>
<td>43.4</td>
</tr>
<tr>
<td>Lack of ideal business location/Teacher transfers</td>
<td>6</td>
<td>15.8</td>
</tr>
</tbody>
</table>

100% of the sampled population sited lack of adequate funds as the major constraint to investment especially in areas requiring heavy capital like purchase of some securities like bonds, irrigation of land as it requires drilling of boreholes or tapping rain water and other inputs requiring a lot of funds. Natural factors like diseases/pests, lack of adequate time to manage investments due to work overload and lack of reliable and affordable workers to manage on their behalf were sited. Sixty three percent (63%) of the sampled population had difficulties in identifying best business opportunity hence ended up spending more than they had planned. Poor performance/business failure was highlighted as a major factor. Many respondents had tried investment in small business but ended up closing down due to making of perpetual losses and low returns (10.5% of the sampled population).
Discouragement from others and lack of good role models was also sited as a factor by twenty one point one percent (21.1%). Legal factors/ formalities involved was sited as a factor barring teachers from investing in competing businesses especially in areas of the education due to registration bottle necks. Taxation reduces the disposable income limiting the amount available for investment. It is a legal requirement that the teacher investor has to be left with at least on third (1/3) of the salary after deductions limiting the amounts of loan able funds accessible for investment.

Uncertainty about returns from investments end up frustrating teachers due to the low returns such that they have to go for unplanned short loans to cover the variance between planned and actual expenditure, thus some investments are not self sustaining. The post election violence of 2007/2008 led to inflation reducing the real income hence low savings and investment this was sited as a major factor by (84%) of the sample. Lack of proper methods of preserving agricultural produce coupled with lack of adequate market led those engaged in farming to sell their produce at throw away prices during harvesting time as the amounts stored ends up being spoilt. Lack of proper planning and inability to stick to budget due to rising cost of fuel and foodstuffs coupled with lack of self control in areas of spending and low returns make them live below the level of their income. The problem is made worse by high dependency ratio in the rural areas (African socialism). Unplanned emergences like sicknesses and inflation end up drawing excessively from investments leading to losses/ closure of businesses.

Lack of technical knowledge led to difficulties in prioritizing/ selecting best investment opportunities. This also leads to inability to keep proper investment/ business records making it difficult to monitor the progress of the investment. This lead to losses/low returns due to inability to identify investments with high returns and low risks. The transfer of teachers’ posses’ problems of choice of the best investment site for a business. This is made worse by excessive competition from the large scale retailers /wholesalers for teachers engaged in retailing businesses as the later can offer more competitive prices.
4.5.0: Risk factors facing the teacher investor in the district

Table 4.0 Risk factors facing the teacher investor in the district

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>No. of respondents</th>
<th>Response rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty of returns due to natural factors, unemployment, competition, inability to forecast.</td>
<td>25</td>
<td>65.8</td>
</tr>
<tr>
<td>Inflation</td>
<td>32</td>
<td>84.2</td>
</tr>
<tr>
<td>Business risk due to size, competition, natural factors</td>
<td>8</td>
<td>21.5</td>
</tr>
<tr>
<td>Financial risk high cost of borrowing</td>
<td>18</td>
<td>47.4</td>
</tr>
<tr>
<td>Liquidity risk: losses/inability to pay debts</td>
<td>4</td>
<td>10.5</td>
</tr>
<tr>
<td>Legal/political factors/Administration bottle necks</td>
<td>2</td>
<td>5.3</td>
</tr>
<tr>
<td>Inadequate resources/lack of good monitoring/time/dependable workers.</td>
<td>25</td>
<td>65.8</td>
</tr>
</tbody>
</table>

The following factors were identified as the major risk factors: Uncertainty of returns due to inability to predict the expected returns from investment had a response rate of sixty five point eight percent (65.8%). Only (7.5%) was able to estimate their returns at least with certainty. This makes it difficult for planning/budgeting for investment/returns. This is due to risk factors like inflation due to the post election violence of 2007/2008 which led to rising cost of foodstuffs, fuel, raw materials and other inputs increasing expenditure hence reducing real returns. This risk factor was sighted by (84.2%) of the sample. Financial risks were also high due to high cost of borrowing. The liquidity risk was high as some of the teachers who had small businesses had to close them down as they were financed by debt. Business risks were mentioned by (21.1%) of the sample as a major factor for those with
small size of businesses like shops as they faced stiff competition from the large scale retailers.

Legal factors such as pay as you earn (PAYE) on teachers salary is progressive increasing with the increasing level of income. This reduces the real disposable income reducing savings and investment. This is made worse due to double taxation of corporation profits as their profits are taxed as well as dividend earned by individual investors. Sixty five point eight percent (65.8%) of the sampled population identified uncertainty about the future especially in the field of agriculture as the major cause of low returns. Natural factors like lack of adequate rain leading to crop failure pest and diseases lack of proper markets for the produce coupled with lack of proper preservatives for the produce led to low returns as some got spoilt. Uncertainty about the future plus lack of know-how led some teachers to invest in adventures that failed discouraging themselves and others. The fluctuating low returns from shares dividends discourage investors.

The opportunity cost of foregoing present consumption (RFR) is very low especially among the newly employed (below 25 years) partly due to the low returns and high unemployment rate. 70% of those in this age bracket had not invested in any other area apart from investment in education. Another source of uncertainty is competition due to inability to plan with certainty due to lack of know how and time to run the business (due to work overload and inability to afford reliable/skilled personnel to man the business thus increasing the business risk. Lack of proper monitoring and recording makes the investor realize that he/she is loosing when it’s too late as identified by (65.8%) of the sample. This is partly caused by information asymmetry as they base their decisions on historical figures which may not be good estimate of the future for a non skilled planner. Lack of dependable employees and proper monitoring increase the risk of misappropriation of funds. In times of inflation investors prefer present consumption to future one due to deteriorating value of money therefore the opportunity cost postponing consumption is high encouraging risk aversion preference for the teacher investor.
4.5.0: Risk/return relationship

Risks increase uncertainty about the future returns. They are thus a cost to the teacher investor. If the market is efficient the prices of product should reflect their level of risk thus expected returns. The higher the risks the higher the expected returns. If investors are rational, for any giving level of risk they would prefer investments that yield higher returns while given the level of expected returns, they would prefer investments with lower risks. Investors therefore strive to minimize risk (cost) in order to maximize returns. This is possible if proper planning of investment is done in order to develop an optimal portfolio of investment in face of risk as explained in chapter two. Adoption of risk management strategies is necessary for proper control and monitoring of an optimal portfolio as explained.

4.6:0 Measurements of teacher’s returns and risks to investments

Table 5: Teacher investor’s ability to Measure their returns and risks to investments.

<table>
<thead>
<tr>
<th>Level of ability</th>
<th>No. of respondents</th>
<th>Response rate (%)</th>
<th>Cumulative response rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very certain</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Certain</td>
<td>3</td>
<td>7.9</td>
<td>7.9</td>
</tr>
<tr>
<td>Uncertain</td>
<td>15</td>
<td>39.5</td>
<td>47.6</td>
</tr>
<tr>
<td>Not certain</td>
<td>20</td>
<td>52.6</td>
<td>100</td>
</tr>
</tbody>
</table>
Ninety two point one (92.1%) of the sampled population were unable to measure their future returns\risks to investment with certainty. From the literature review risks/returns can be measured on a stand alone basis (in which case the individual assets risks/returns are analyzed) or on a portfolio basis in which risks/returns are measured on basis of the combination of assets that an investor holds. This is necessary because diversification reduces the level of risks. The return for a portfolio of assets is the sum of weighted expected returns from the assets held in the portfolio. The following portfolio formula was used to calculate the expected rate for portfolio of assets held by each sampled teacher investor.

\[ \text{ER (port)} = \sum_{i=1}^{n} W_i R_i \]

Where \( \text{ER (port)} \) is the expected rate of return of a portfolio.

\( W_i \) = weight of individual assets in the portfolio

\( R_i \) = the expected rate of return for asset \( i \)

Source: Ross Et al (2001:332)

The relevant measure of risk for a portfolio of investment is the weighted covariant of returns to assets held in the portfolio. For standardization purpose the covariance is divided by the standard deviation of the different assets held in the portfolio to get the correlation coefficient which ranges from positive one to negative one as explained under literature review. A coefficient of variation can be calculated to measure the level of risk per unit of return. The above measures of risk were calculated using the following formulas computed using a computer software I programmed (S. P. S.S)

\[ \text{6}_{\text{port}} = \sqrt{\sum_{i=1}^{n} W_i^2 6_i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} W_i W_j \text{Cov}_{i,j}} \]

\( W_i \) = weights of an individual asset in the PF determined by the proportion of value in the PF.

\( 6_i^2 \) = variance of Rate of return for asset \( i \)

\( \text{Cov}_{ij} \) = the covariance between rate of return \( r \) for asset \( i \) and \( j \) where \( \text{cov}_{ij} = r_{ij} 6_i 6_j \)
Portfolio is thus a function of weighted average of individual variances and weighted covariance between the two assets in the portfolio.


The higher the standard deviation/coefficient of variation the higher the risk and the higher the expected return.
4.7.0: Investment strategies/risk management strategies adopted by teacher investors in Mbeere south district.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>No. of respondents</th>
<th>Response rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accumulating wealth</td>
<td>27</td>
<td>71</td>
</tr>
<tr>
<td>Preserving wealth</td>
<td>2</td>
<td>5.3</td>
</tr>
<tr>
<td>Accumulation of human capital</td>
<td>38</td>
<td>100</td>
</tr>
<tr>
<td>Proper planning</td>
<td>20</td>
<td>52.6</td>
</tr>
<tr>
<td>Cost reduction/savings</td>
<td>25</td>
<td>65.8</td>
</tr>
<tr>
<td>Diversification</td>
<td>16</td>
<td>42.1</td>
</tr>
<tr>
<td>Insurance</td>
<td>2</td>
<td>5.3</td>
</tr>
<tr>
<td>Proper monitoring/recording</td>
<td>12</td>
<td>31.6</td>
</tr>
</tbody>
</table>

Table 7. Showing Investment strategies/risk management strategies adopted by teacher investors in Mbeere south district.

From the primary data gathered, 71% of the teacher investor aimed at accumulating wealth with time by diversifying their investments while others aimed at preserving their capital hence investing in low earning but secure investments like saving with SACCOS where investments and loans are secured. 100% had invested in educating themselves, their children and their siblings thus targeting at generating current income for spending. Other investors have adopted a total return strategy by combining maximization of income through education and capital gains from sale of real assets/fixed assets.

The sampled teachers identified the following risk management strategies: Fifty two point six percent (52.6%) of the sampled group identified the need for proper planning which is
possible if there is investment in human capital. Enlightening the society on existing investment opportunities in the district would ensure that the teacher investor invest in areas with higher expected returns that cover costs (including risk.). Where information is lacking professional guidance could be sort to assist in identifying investment opportunities, cost/risk minimization strategies in order to maximize returns to investment. The 65.8% of the group mentioned the need to forego present consumptions /luxuries in order to raise the level of savings to avoid liquidity risks associated with dependence on external borrowing.

The sampled group suggested the need for proper focus into the future in areas of political, social and economic nature by analyzing the past events in to make a forecast into the future. This could help reduce the risk of uncertainty associated with changes in the above areas. 42.1% suggested the need for diversification as a way of reducing the risk of over dependant on a few areas of investment while others diversified unconsciously. The use of modern methods of farming such as irrigation, spraying, proper preservation of produce, early planting would help in overcoming risks associated with natural factors improving the quality of produce.

The government attempts to raise the wage rates and harmonise them for different sectors in the economy may motivate the workers ensuring fairness in distribution of income. This would increase the disposable income encouraging savings and investment, if inflation is controlled as suggested in the 2010/2011 budget. Risk reduction through ensuring safety of investment by taking insurance cover was also mentioned by 5.3% of the sample. Thirty one point six percent (31.6%) identified the need for proper monitoring investments which would help in identifying assets that need to be purchased or sold and businesses that need to be closed down to avoid excessive losses by the teacher investor. This requires proper recording and timing of activities of the investor to ensure that timely decisions are made such as early planting for farmers and getting rid of unreliable workers.
CHAPTER FIVE

5.0: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter contains a summary of findings and interpretations of the secondary data and primary data obtained from the research as well as the researcher’s views and recommendations as explained below.

5.1:0 Summary.

This contains a summary of finding, discussion and interpretation of result obtained from the sampled thirty eight (38) teachers in Mbeere south district using stratified sampling as showed in appendix III. The main purpose of the study was to find out how a teacher investor can develop an optimal P.F of assets that can maximize his returns subjects to risks. This is important because teachers impart a lot on the community by nature of their profession. If teacher’s investments would expand they could create more job opportunities and aid in accumulation of human capital.

The process of developing an optimal P.T of assets for an investor involves identifying an investor investment policy subject to investors risk preference. The investor must solicit enough funds from saving, borrowing from institution like banks among others which involves a cost to be met. The choice of investment to be undertaken requires careful cost benefit analysis in order to maintain sound liquidity position of the business and avoid pyramid investment that end up closing down. The management thus requires to carry out a careful SWOT analysis in order to project into the future and identify the investors strengths, weaknesses, opportunities and threats in environment that may thwart his efforts. Most of the sampled teachers in the district did not do this hence ended up investing in pyramids that failed due to liquidity risks partly due to lack of knowledge and ignorance of the risk /cost implications.

From primary data collected the following investment opportunities were undertaken by teachers’ investors in the two year 2008/2009 respectfully: Education (100%), purchase/sale of land and farming 52.6% and 57.9%, Securities mainly in Saccos (60.5%), fixed assets
(13.2% - 18.4%) year 2008-2009, Business (10.5%) year 2008-2009. None had in investment in derivatives like forward contracts options. From table 1 pages it can be seen that teacher investor had not fully diversified his/her investment accounting for the low returns realized from their investment. They have neglected investment in assets yielding fixed returns like bonds, treasury bills and fixed account which could provide returns for meeting financial obligations like repaying overdue creditor accounts through proper assessment of firm's needs. The rate of return from education appears low but the benefits are long lived as it opens the investor to a wind range of opportunities hence the need to invest in human capital. When selecting assets for investment an investor can consider some of the following methods: the pay back method which considers the time required recouping the initial investment from returns, the net present value method (NPV) in which the investor prefers assets/projects with positive NPV or present value of differences between cash in flows and out flows. Profitability index which is the ratio of present value of cash in flow to that of cash out flows need to be considered in order to select projects with higher returns among other methods. It's also necessary to consider whether investments are divisible/indivisible, independent or mutually exclusive as well as the funds available for investment.

The following investment constraints/risk factors were identified by the teacher investors in order of preference. Lack of adequate funds for investment, inflation, lack of adequate time due to work overload, natural calamities, Inability to identify best investment opportunities due to lack of know how/lack of good role models and discouragement due to past failures. Legal formalities barr them from investing in competing types of businesses according to teachers code of conduct and ethics legal notice (2003) no. 137 section 15(1). Lack of good markets and storage facilities for agricultural products, uncertainty about the future coupled by difficulties in prioritizing/selecting best areas of investment and high competition were sighted as the major constraint. Proper (SWOT) analysis and seeking of professional guidance in areas of investment from banks and other lending institutions would help overcome such constraints. Internet services over the same can be accessed even using mobile phones.
It's very important that an investor is in a position to identify the risk factors facing their investment as this would cause uncertainty cash flows. Ninety two percent (92%) of the sampled teachers were not able to identify risk factors facing their investments with certainty hence some of them ended up closing down their businesses due to risk factors such as inflation, liquidity problems and dishonesty of workers. Others factors included the high cost of borrowing due to inflation following the 2007 post election violence, business risk due to competition from large scale businesses, taxation by the government reducing the disposable income and natural calamities like pests and drought. Lack of proper planning, recording, monitoring and risk aversion led to avoidance of risky but more profitable ventures.

Investors must learn how to measure their risks and estimate their expected returns and constantly monitor the variance between actual returns results and the expected, and then take the necessary action. Table 8, chapter 4 shows the summarised coefficient of variation (CV) which measures the risk per unit of expected return for the thirty eight teachers who responded. Two teacher's identity 18 and 21 could not have their (CV) calculated because they were unable to estimate their investment costs making it difficult to estimate their P.F expected return. Seventy one percent (71.%) of the sampled teachers' investments in the district year 2009 were too risky meaning that the risk involved per unit was higher than the expected return.

I would recommend the investors to embark on continuous evaluation of risk/return relationship to ensure that assets which have a high risk per unit of expected return are sold off while those with lesser values are bought as they have higher return prospects in the future. It's worth noting that returns in education may appear low but the benefits are spread over along period. I would advise teachers to diversify their investments as this helps in reducing the risk per unit of return.

5.2.0: Conclusion

In conclusion development of an optimal P.F of assets for a teacher investor requires development of an investment policy in line with the investors risk preference. It involves careful (SWOT) analysis in order to identify and build on investors strengths/opportunities.
and lay strategies on how to overcome his weaknesses/threats in areas of investment such as his lending policies and Competitors among others. Computation of business ratios such as liquidity ratios, stock turnover ratios, leverage ratios among others may help identify possible risks that the investor may face. The investor requires to solicit enough funds and identify investment opportunities/constraints facing him as well as risk factors that may thwart his efforts. This requires careful knowledge of risk returns relationship. An investment strategy should be adopted that minimizes risks, through diversification of investment, taking insurance covers, making timely decisions, compliance with legal requirements among others. Constant monitoring of investment is necessary to correct any deviations of actual returns from the expected. Where such knowledge is lacking, professional guidance need to be sought.

5.3.0: Recommendations

An investor needs to adapt an investment strategy that is in line with the investors risk preference. Such a strategy needs to incorporate risk management in order to minimize risks and maximize returns. The process of creating an optimal portfolio for an investor requires proper selection of assets for investment which requires proper planning and sourcing of funds in order to cut down the risks/cost and make informed investment decisions. This requires a SWOT analysis in to identify the strengths of the investor overcome his/her weaknesses, identify opportunities in the external environment that could give him competitive advantage Michael Porter (2004) and the threats in the environment that could lead to business failure. Selection of investment depends on availability of funds and cost implications in order to ensure that they do not exceed the expected returns. This requires excessive strain and opportunity cost of foregoing present consumption in order to raise savings for investment, or borrowing from external sources which requires careful screening of opportunities available to ensure that they do not lead to liquidity risks or bankruptcy. Reilly (2007).

The investment strategy adopted needs to incorporate risks as one of the cause of low returns. The risk of uncertainty caused by natural factors like drought, economic changes like inflation and business slums, political changes like the post election violence, social changes in consumers taste can be reduced by careful SWOT analysis. This requires careful
analysis of the past events in the above areas before making decisions about the effects of the above changes on returns and risk. This requires good forecast of the effects of the unforeseen changes on cash flows/returns from investment and weighing them against the expected risk before making the investment decision.

According to Ross (2006) diversification helps in reducing the risk associated with dependants on a few of investment like farming where the risk of uncertainty is high due to the semiarid nature of the district. Use of modern methods of farming like irrigation, control of pest, vaccination among others. Ministry of education (2005:142) would help in producing quality and quantity products which are easy to market. There is also a need to improve on public relations as a marketing strategy which could help in increasing sales instead of selling products at throw away price during harvest time due to the shortage of the market. Avoiding wasteful competition associated with duplication of investment in retail business and farming of similar products could help in raising returns. None of the teacher investors sampled had invested in securities with fixed returns like government bonds and treasury bills whose returns are guaranteed and may help generate returns in face of risks thus reducing liquidity risks.

Compliance with legal requirements for investment is vital in avoiding risk of getting jailed, fined, or going through the lengthy court procedure. This could spoil the investors’ public relation/image or even lead to sacking. Teachers code of ethics (2003). Tax payment and obtaining license for carrying out businesses is necessary though it has a cost implication which can be overcome through proper budgeting of income and expenditure, where such knowledge is lacking professional guidance can be sought.

The government policy of creating jobs for the youth may help encourage investment in human capital which is necessary for entrepreneur development. The high levels of unemployment demotivate the youth such that they don’t see the need to excel academically. This makes the teaching activity very difficult as some of the youth prefer dropping out of school to engage in the thriving miraa business demotivating the teachers’ efforts of increasing the mean score which is one of the basis upon which they are evaluated. The government attempt to harmonize the wage rates in different sectors of the economy may
help in ensuring fairness in distribution of income. This will hopefully raise the returns to labor reducing the brain drain especially with the reinstatement of East African Common market. This will help in attaining the millennium goal of education for all by the year 2015.

Maintenance of an optimal portfolio of assets (P.F) requires not only selecting the best combination of assets that yield maximum returns but also adoption of risk management strategies that will reduce uncertainty of such returns. Such strategies include risk reduction associated with diversification which reduces the standard deviation or coefficient of variation of returns as explained under literature review. Risk transfers strategies can also be adopted by insuring businesses or investing in derivatives such as forward contracts and future options. Risk avoidance strategies can also be adopted by investing in securities that have fixed returns such as treasury bills, government bonds, and savings in banks fixed deposit accounts to ensure regular cash flows and overcome liquidity risks. Insuring investments is necessary accounting for the large number of investments in Sacco savings amongst teachers. Adoption of insurance of investments by taking insurance policies like fidelity guarantee cover for workers holding key positions in a business (like accountants) may help protect against the risk of dishonest workers which was sited as a major cause of business failure by a teacher investor twenty six point three two percent (23.32%).

There is a need for proper monitoring and control of a portfolio developed. This requires use of a feedback loop that will alert an investor of any divergence between targeted and actual outcomes. This requires proper recording and timing of investment activities. Effective communication is also necessary to avoid costs associated with unnecessary delays. Proper auditing of investment accounts is necessary though this requires information on investment opportunities, risk return relationship, cost minimization strategies, effective monitoring/auditing of investments outcomes which the investor may be lacking. Such information could be obtained by seeking professional guidance or through business partnerships/mergers to facilitate sharing of professional knowledge which is vital for success of business. This would help avoid business risks (associated with inability to achieve investors objective), engagement risk associated with settling for a low income due and poor service delivery, inherent risks associated with competency and nature of the business, control risk.
caused by inability to control risks and risks associated with misstatement of final accounts

Development of an optimal P.F of assets requires a continuous process of identifying
investors Investment objectives in line with his risk preference, identifying possible risks
including costs and minimizing them in order to maximize returns this involves analyzing
the micro and macro variables that impart on their business through SWOT analysis and
adoption of required investment strategy. Constant monitoring of P.F of assets is necessary
by use of profitability ratios, liquidity ratios, leverage ratios among others in order to
identify and control any deviations from planned targets of returns and risks as explained
earlier.

It’s important to note that no single variable can adequately be used to measure the level of
risks associated with cash flows. The beta coefficient suggested be CAPM theory is unstable
even for the same business over time .Multi factor theories by Fame (1996) and Ross (1976,
1977) among others do not tell us the exact number of risk factors or the magnitude of these
risk factors. Like Reilly (2006) I Would recommend further research be carried out in this
area of risk measure.
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APPENDIX I

QUESTIONNAIRES DISTRIBUTED TO SECONDARY SCHOOL TEACHERS IN MBEERE SOUTH DISTRICT.

Please respond to all the questions on the questionnaires on this sheet. The information given will be treated with strict confidence and will be used for research purpose only. For alternative type of questions please tick only the correct entry on the bracket for an answer. For open ended questions, please be brief and concise.

1. Name of the school ___________________________ Location/ Division ___________________________

2. Please indicate the school category

<table>
<thead>
<tr>
<th>Category</th>
<th>( )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provincial</td>
<td></td>
</tr>
<tr>
<td>District</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td></td>
</tr>
<tr>
<td>Boarding</td>
<td></td>
</tr>
<tr>
<td>Day</td>
<td></td>
</tr>
</tbody>
</table>

3. Please indicate your sex: Male ( ) Female ( )

4. Age: -

<table>
<thead>
<tr>
<th>Age Range</th>
<th>( )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 25 years</td>
<td></td>
</tr>
<tr>
<td>26 - 30 years</td>
<td></td>
</tr>
<tr>
<td>31 - 35 years</td>
<td></td>
</tr>
<tr>
<td>36 - 40 years</td>
<td></td>
</tr>
<tr>
<td>41 - 45 years</td>
<td></td>
</tr>
<tr>
<td>46 and above</td>
<td></td>
</tr>
</tbody>
</table>

5. What is your highest academic qualification: -

<table>
<thead>
<tr>
<th>Qualification</th>
<th>( )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma</td>
<td></td>
</tr>
<tr>
<td>Applied Teacher Status</td>
<td></td>
</tr>
<tr>
<td>University graduate</td>
<td></td>
</tr>
<tr>
<td>BA, BSC with PGDE</td>
<td></td>
</tr>
<tr>
<td>BA or BSC</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td></td>
</tr>
<tr>
<td>Any other</td>
<td></td>
</tr>
</tbody>
</table>

6. Salary: -

<table>
<thead>
<tr>
<th>Salary Range</th>
<th>( )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 10,000</td>
<td></td>
</tr>
<tr>
<td>10,000 - 15,000</td>
<td></td>
</tr>
<tr>
<td>15,001 - 20,000</td>
<td></td>
</tr>
<tr>
<td>20,001 - 25,000</td>
<td></td>
</tr>
<tr>
<td>25,001 - 30,000</td>
<td></td>
</tr>
</tbody>
</table>
30,001 - 35,000 ( )
35,001 - And above ( )

7. What are your main areas of investment in the year 2008 and 2009 in order of preference? 

8. Please indicate how much income you earned for the years ended 1/1/2008 and 1/1/2009 from the following sources of income / returns as

<table>
<thead>
<tr>
<th>Source of Income</th>
<th>1/1/2008</th>
<th>1/1/2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Land/ Farming / Sale of land</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Ownership of real estates/ fixed Assets like buildings, Vehicles among others</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Share dividends from SACCOS / Companies among others</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Interest on bonds, treasury bills among others</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Profits from business (Please specify)</td>
<td>( )</td>
<td>( )</td>
</tr>
</tbody>
</table>

9. How much had you spent on the items below for the year ended 1/1/2008 and 1/1/2009.

<table>
<thead>
<tr>
<th>Item</th>
<th>1/1/2008</th>
<th>1/1/2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquiring knowledge for self enhancement and development</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Land purchases, farming expenses among others</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Real estates / fixed assets like Buildings, Vehicles among others</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Purchase of shares in SACCOS</td>
<td>( )</td>
<td>( )</td>
</tr>
</tbody>
</table>
Kshs.08 kshs.09
and companies among others ( ) ( )
Purchase of bonds, treasury bills
And any other units of loan ( ) ( )
any other expenditure aimed at
Increasing returns ( ) ( )
Please specify

10. Please list five ways in which you tried to reduce the above costs in order of preference;
   i. 
   ii. 
   iii. 
   iv. 
   v. 

11. Have you gone for any upgrading course between 1/1/2004 and 1/1/2009? If yes please specify stating how much you have spent on it.

12. How much do you think the above added to your total returns for the year ended 1/1/2009? (Kshs )

13. How else does investing in human capital help you as an individual and society at large?

14. Identify any five challenges you faced when choosing the type of investment to adapt.
   i. 
   ii. 
   iii. 
   iv. 
   v. 

15. What risks/uncertainties did you faced in relation to your cash inflows/returns during the year ended 1/1/2009?

16. Were you able to anticipate the risks before they occurred? Please explain your answer.
17. In what ways did the risks affect your returns in the year 2008 / 2009?

18. Briefly explain what you could do in order to maximize your returns.

19. Are you in a position to estimate the likely returns from your investments with certainty? Please tick the most applicable: -
   Very certain ( ) Certain ( ) Uncertain ( ) Not certain ( )

20. In what ways do you feel that the above information on investment and risk could be useful to you and to the society: -

21. Explain any five challenges you faced in your attempt to raise (maximize) your level of annual returns from various investments.
   i. 
   ii. 
   iii. 
   iv. 
   v. 

22. Briefly explain how you overcame the above challenges
### APPENDIX II

**A DIAGRAM SHOWING THE CATEGORIES OF SECONDARY SCHOOLS SELECTED AS SAMPLES IN MBEERE SOUTH DISTRICT**

<table>
<thead>
<tr>
<th>DIVISION</th>
<th>SCHOOL CATEGORY</th>
<th>BOARDING / DAY</th>
<th>SAMPLE SCHOOL</th>
<th>SAMPLE SIZE</th>
<th>SAMPLE PROPORTION</th>
<th>POPULATION OF TEACHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gachoka division</td>
<td>Provincial</td>
<td>Boarding</td>
<td>Nyangwa Boys</td>
<td>4</td>
<td>0.25</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>Boarding Girls</td>
<td>St Clare</td>
<td>2</td>
<td>0.25</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed</td>
<td>Ngenge Secondary</td>
<td>2</td>
<td>0.25</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day</td>
<td>Yoder Mixed</td>
<td>2</td>
<td>0.25</td>
<td>7</td>
</tr>
<tr>
<td>Private</td>
<td>Boarding</td>
<td>St. Marys</td>
<td>1</td>
<td>0.25</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Mwea Division</td>
<td>Provincial</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>Day / Boarding</td>
<td>Makima mixed</td>
<td>4</td>
<td>0.25</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day / boarding</td>
<td>Mbondoni mixed</td>
<td>3</td>
<td>0.25</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day</td>
<td>Mashamba mixed</td>
<td>1</td>
<td>0.25</td>
<td>5</td>
</tr>
<tr>
<td>Private</td>
<td>Mixed</td>
<td>Winpride</td>
<td>1</td>
<td>0.25</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Kiritiri Division</td>
<td>Provincial</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>Day and Boarding</td>
<td>Mayori mixed</td>
<td>4</td>
<td>0.25</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day</td>
<td>Mbita mixed</td>
<td>3</td>
<td>0.25</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day</td>
<td>Machanga mixed</td>
<td>3</td>
<td>0.25</td>
<td>10</td>
</tr>
<tr>
<td>Private</td>
<td>Day and boarding</td>
<td>Consolata girls</td>
<td>2</td>
<td>0.25</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Kiambere Division</td>
<td>Provincial</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>Day and Boarding</td>
<td>Kiambere mixed</td>
<td>4</td>
<td>0.25</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boarding</td>
<td>Mariari girls</td>
<td>2</td>
<td>0.25</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day and boarding</td>
<td>Mutuovar e</td>
<td>2</td>
<td>0.25</td>
<td>7</td>
</tr>
<tr>
<td>Private</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td>40</td>
<td>160</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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APPENDIX III

TIME PLAN

The following activities will be carried out as stipulated.

Activity number,

<table>
<thead>
<tr>
<th>Activity number</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Piloting or pre-testing of questionnaires</td>
</tr>
<tr>
<td>2</td>
<td>Distribution of questionnaires</td>
</tr>
<tr>
<td>3</td>
<td>Gathering additional information from secondary sources</td>
</tr>
<tr>
<td>4</td>
<td>Data compiling</td>
</tr>
<tr>
<td>5</td>
<td>Data interpretation and making recommendation</td>
</tr>
<tr>
<td>6</td>
<td>Printing the information</td>
</tr>
<tr>
<td>7</td>
<td>Proof reading and printing final draft</td>
</tr>
<tr>
<td>8</td>
<td>Presenting final draft</td>
</tr>
</tbody>
</table>

Time in weeks
APPENDIX IV

BUDGET PLAN

The researcher / her assistant intends to make five trips to the various schools by combining visits to schools located within the same locality as shown below:

TRIPS

1. Transport and fuel from St. Clare girls to St. Mary’s girls, Gene Secondary, Niangua secondary, Mayori Secondary, Igumori and back ................................................................. 2,000
2. Transport from St. Clare to Igumori Secondary, Mariari and Kiambere mixed and back ................................................................. 2,000
3. Transport from St. Clare to Machanga, Consolata girls and Mutuovare and back ................................................................. 2,500
4. Transport from St. Clare to Yoder, Makima and Mashamba Secondary and back ................................................................. 1,500
5. Transport from St. Clare to Wachoro secondary, Win pride And back................................................................. 2,500

Total Transport..................................................................... 10,500

Lunch @ 300 per trip................................................................. 1,500
Cost of typing 3 pages of questionnaires@30................................. 90
Photocopying of questionnaires and others stationery expenses........... 2,000
Purchase of reading materials and internet services..................... 5,000
Research assistant remuneration............................................ 5,000
Expenses related to compiling data ........................................... 10,000
Printing of the final draft......................................................... 4,000
Contingencies ...................................................................... 5,000

Total expenditure ................................................................ 43,090