CHAPTER I

INTRODUCTION

1.1 Background

The linear risk return trade off (Sharpe, 1964 and Lintner, 1965), with risk measured by the beta coefficient (which reflects covariance or non-diversifiable risk) is one of most resorted models in the finance literature with simple message that the only risk that is priced at equilibrium in the market is that undiversified risk. CAPM was developed in a relatively restricted theoretical environment. However, it has provided strong empirical implications that systematic risk and return are linearly related in the capital market. In the last two decades the field of asset pricing, in both the theoretical and empirical domains, has advanced significantly (Celik, 2012).

Today investors and analysts are practicing different techniques and models to find out the best investment opportunity which will help reduce the risk and bag more return. Capital asset pricing model (CAPM) one of the must use tool for estimating the cost of capital for firms and the return which the investors required by investing in firm's assets (Jagannathan & Wang, 1993). The CAPM explains the tradeoff between the assets returns and their risk. The CAPM measures the risk of an asset by the covariance of its returns with the returns of the overall market (known as market portfolio). CAPM model is based on the Markowitz modern portfolio theory which was further developed by (Sharpe, 1964 and Linter, 1965). The main prediction of the model is that expected return on an asset is linearly related by the covariance of its returns with the return on the market portfolio. Each asset has two types of risk diversifiable (also called as unique) and non-diversifiable (also called market risk) (Lazar and Yaseer, 2012).

It was only with the Capital Asset Pricing Model (CAPM) developed by Sharpe (1964) that one of the important problems of modern financial economics was formalized: the quantification of the trade-off between risk and expected return. Proponents of the CAPM argue that Beta (β), a measure of systematic risk relative to the market portfolio, is the sole determinant of return. Any additional variability caused by events peculiar to the individual asset can be "diversified away" as capital markets do not reward risks borne unnecessarily (Cagnetti, 2001). To date numerous versions, extensions and improvements upon the model. Have been observed in the

empirical literature. They include the old CAPM model (fraught with numerous weaknesses as a result of simplistic assumptions upon which it is based), the Inter-temporal Capital Asset Pricing Model (ICAPM). Asset Pricing Model (CAPM) to name only a few.

Many attempts have been made to see which of them better reflects/determine assets prices in numerous developed and emerging markets worldwide. Analysts have used different related approaches and more tools and related models are being evolved in the literature to deal with this aspect of asset pricing. All the attempts are to see if any one particular model or method could prove to be the most appropriate model for pricing assets and portfolios in the capital markets. In this regard, the Capital Asset Pricing Model (CAPM) a newer variant of the CAPM has attracted latter day analysts and has been adjudged a possible tool of the future in both developed and developing economies. It has received a new energy and is currently at the front burners of capital asset pricing in the empirical literature.

1.2 Problem Statement and research question

The modern portfolio theory explains that there is a clear tradeoff between risk and return. The Markowitz portfolio selection model helps one to plot the efficient frontier of risky assets and provides a useful framework for selecting an optimal combination of risky funds. But this model however does not provide guidance with respect to the risk-return relationship for individual assets (Lazar and Yaseer, 2012). The Capital asset pricing Model explains the equilibrium relationship between the expected return on risky assets. The model provide a mechanism to assess the role of a particular asset in the overall portfolio risk and return and it uses the result of capital market theory to derive the relationship between expected return for the risky assets.

The empirical validity of this model was widely challenged in the late of Seventies, Eighties and Nineties by Roll, Fama French etc. But at the same time there are number of studies which are in favor and supported the usage one factor model CAPM in developing and emerging markets. Literature showed that Sauer and Murphy (1992) in the German Stock Marketdata, (Black and Fisher, 1993; Daniel and Titman, 1997; Gyorgy and *etal,* 1999) for the Hungarian capital market found CAPM model is applicable. Ming-Hsiang (2003) established that empirical performance of the CAPM is encouraging and the CAPM outperforms the CAPM interms of

goodness off it. Similarly Daniel Suh (2009) opined that in a highly volatile market Parameter estimates of the CAPM are generally superior to those of the Fama French three factor model.

At the same time the studies conducted by Roll (1977), Harris et al. (2003) argued against CAPM. Nopbhanon *etal.* (2009) found that Fama French model explain risk in stock return better than the traditional one factor Capital Asset Pricing model. Yan and Liyan (2008) found that the conditional CAPM fails miserably to explain the size effect, the value effect, and the momentum effect. Pablo *et al.* (2007) found that the results of their study propose and supported the explanatory power of Fama French model.

The Sharpe-Lintner-Mossin version of the CAPM is a single period model, and does not account for the possibility of changes in the investment opportunity set, represented by all possible combinations along the capital market line, that is, the risk free asset and the risky asset portfolio with the maximum Sharpe ratio. Because it is an extremely simple model the CAPM is widely used both by academics and finance professionals. Simplicity, however, entails costs: the CAPM is rejected in most of its empirical tests (Machado *et al.*, 2012). Various papers, such as (Loukeris, 2009; Bilgin and Basti, 2011) and so on shows that the rate of return on an asset cannot be determined solely by its covariance with the rate of return on the market. These differences in findings of previously conducted studies serve as a major stimulating factor to test the applicability of the CAPM with historical data collected from the Nepal Stock Exchange. As must of study is rejecting the applicability of CAPM so this study also examines the applicability of Consumption capital assets pricing model in Nepalese Stock market. Thus, the study deals with following issues:

i. Is the CAPM is applicable in Nepalese Stock market? In particular, does the CAPM explain excess return?
ii. Is the intercept equals average risk free rate and slope of Security Market Line equal to average risk premium?
iii. Is the relation between return and beta linear?

1.3 Objectives of the study

The objectives of this study are to study whether the CAPM holds true on the Nepal Stock Exchange. The study has following specific objectives.

i. To examine whether higher/lower risk stocks yields higher/lower expected rate of return.
ii. To examine whether the intercept equals zero/average risk-free rate and slope of Security Market Line (SML) equals the average risk premium.
iii. To identify the linearity relationship between the stock beta (systematic risk) and the expected return.

1.4 Hypothesis

Following hypothesis are set to test the usefulness of the CAPM Model in the Nepalese Stock Market.

1.4.1 CAPM Hypotheses

(Grigris*et al.*, 2006; Jecheche, 2009; Choudhary and Choudhary, 2010) examined the relationship between excess of return of the portfolio with the market risk premium on Athen's Securities Market, Zimbabwe Stock Exchange and Indian Equity Market respectively. Each study found applicability off or the intercept is contradictory with CAPM Hypothesis i.e. $\lambda_0 \neq 0$. Similarly, Yang and Donghui (2006) also found same result about the intercept term and slope of the equation. However, Sauer and Murphy (1992) found intercept is statistically equal to zero in the case of German Stock Market. Regarding SML test (Yang and Donghui, 2006; Loukeri, 2009; Pertros, 2009; Alqisie and Alqurram, 2016) found that slope of market line is different from the slope of SML indicated by CAPM i.e. $\lambda 1 = 0$.

At the same research paper of (Grigris*et al.*, 2006; Jecheche, 2009; Choudhary and Choudhary, 2010) found that the relationship between risk and return linearly related i.e. $\lambda_2 = 0$. However, Studies made by (Banz, 1981; Fama and French, 1992; Bilgin and Basti, 2014) found relationship between them is not linear.

Based on the above findings of the studies and for applicability of the CAPM following hypotheses has been formulated:

1) Null hypothesis ($H0_a$):- Assets portfolio whose returns are uncorrelated with the market returns have expected return equal to risk-free interest rate. ($\lambda_0 = 0$, that is the intercept term is equal to zero). Alternative hypothesis ($H1_a$):- Assets portfolio whose returns are uncorrelated with the market returns doesn't have

expected return equal to risk-free interest rate. ($\lambda 0 \neq 0$ that is the intercept term is not equal to zero.)

2) Null hypothesis ($H0_b$):- There is no price of risk in the capital markets. ($\lambda_1 = 0$)
Alternative hypothesis ($H1_b$):- There is a price of risk in the capital markets.($\lambda_1 \neq 0$)

3) Null hypothesis ($H0_c$):-The portfolios return and beta are linear related with each other. ($\lambda_2 = 0$)

Alternative hypothesis ($H1_c$):- The portfolios return and beta are not linearly related with each other. ($\lambda_2 \neq 0$)

1.5 Rationale of the study

The CAPM is associated with a set of important implications which are often the bases for establishing the validity of the model. This study helps investor whether CAPM can be used in calculating the required rate of return of a share will only consider systematic risk to be relevant. It also helps to trace out whether the securities that exhibit high levels of systematic risk are expected to yield a higher rate of return in the Nepalese Stock market which can be important factor in investment decision. On average there is a linear relationship between systematic risk and return, securities that are correctly priced should plot on the SML. This study also helps to trace out the impact of the aggregate consumption on the portfolio return.

1.6 Limitations

This study has been limited by following facts.

i. Out of listed company in NEPSE during the study period. Only 29 regularly traded company's stock has been selected as the sample. So, number of companies used to construct the portfolio is one of the important limitations.
ii. The past literature has used more 30 years data to test CAPM and the market portfolio plays an important role in the test results. The use of 9 years data and conducted tested with return of only one index is one limitation. Increase in the time horizon may have different outcomes of the study.
iii. This study has used only capital gain while calculating return on the stock. This study do not consider the effect of stock dividend and cash dividend on share prices assuming that major impact of the earning is defined by retained earnings because

retain earnings ratio of Nepalese organization are high.

1.8 Outline of the report

The early part of this research report consists of front page, recommendation letter, viva- voice sheet, acknowledgement, declaration, table of contents, list of tables, list of figures, and list of abbreviations. The main body part of this report consists of five sections as follows.

Chapter I deals with the subject matter consisting of introduction, problem statement, research questions, objectives of the study, significance of the study, rationale for the research project, and limitations of the Study.

Chapter II includes the reviews of literature and provides theoretical framework that shows the basis of the research. In addition to this it also deals with various work analysis and discussion related to CAPM.

Chapter III categorically mentions the methods adopted in carrying out the present research. It includes research design, sources of data, and hypothesis for the research, data collection procedure, data processing, data analysis tools and also about the limitation of the methodology.

Chapter IV concerns with analysis and the research findings. The results of the analysis have been presented in tabulated form along with explanation where ever is necessary. The findings of the study have been mentioned separately.

Chapter V provides a number of concluding observations and recommendations. The discussions, conclusion and implications of the study are presented in this chapter.

CHAPTER II

LITERATURE REVIEW

This chapter provides current stage of the research work, guidelines and helps to avoid unnecessary duplication of research work. It is devoted to identification, collection and evaluation of previous research work on the CAPM. Therefore, the following three main sections deal with theoretical review, review of previous studies on the relevant field and theoretical framework. The first section provides theoretical review on capital assets pricing model and consumption capital asset pricing model. Second section presents empirical experience of previous studies which include review of the empirical evidences of previous studies related to CAPM. The third section identifies the research gap and presents theoretical framework.

2.1 Theoretical review

In this section, theoretical review is presented to have an insight into capital assets pricing model (CAPM).

2.1.1 Capital asset pricing model (CAPM)

The CAPM builds on the model of portfolio choice developed by Harry Markowitz (1959). In Markowitz's model, an investor selects a portfolio at time t-1 that produces a stochastic return at t. The model assumes investors are risk averse and, when choosing among portfolios, they care only about the mean and variance of their one-period investment return. As a result, investors choose "mean-variance efficient" portfolios, in the sense that the portfolios minimize the variance of portfolio return, given expected return, and maximize expected return, given variance, thus, the Markowitz approach is often called a "mean- variance model". (Idolor & Joseph, 2010).

It is the model linking the required rate of return on a security risk as measured by beta. The model used to calculate the return of the financial security depending on three factors: risk free (R_F), return of market (R_m) and risk of company measure by beta coefficient (Reily and Brown, 2006). The model that represents this relation was first proposed independently by John Linter, William F.Sharpe and Mossin, J. as follows:

$Re_i = R_f + \beta_i(R_m - R_f)$ …… (1)

Where:

R_{ei}: Expected return on the stock prices of the company i.

R_f: Risk free rate and includes the return on Treasury issued by the Central Bank. β_i: Beta coefficient for the company i.

R_m: Return on the market portfolio.

The expected return on a stock depends on the value of beta coefficient for this stock, and the relationship between beta of shares and there turn is positive relationship as assumptions at CAPM.

Market portfolio: the portfolio containing all the securities in the market commensurate with market value.

Beta represents the amount of relative change expected to happen in the return for portfolio compared to the change in the incident average yield of shares traded in the stock market or the so-called earnings per share, so used as a measure to assess the market risk of shares or the portfolio.

The coefficient is known beta as a statistical measure of the systemic risk , and measure the beta sensitivity of the securities return to portfolio return in the market (the index of stock prices), and value-based beta on the historical relationship between the financial security rate of return and the portfolio rate of return, statistically represents the variation joint Covariance between financial security and the market return, also considered beta coefficient as an indicator of the direction also the degree of sensitivity for the company's return to the market rate of return; the sense that the company, which is the beta coefficient equal to one is true, they are moving the same amount and direction that moves by the market. (Hattab, 2008). Beta coefficient measures the sensitivity of earnings per share and return to the market, so the calculation as the following.

Where,

$$\beta = \frac{Cov\ (Rs,Rm)}{\sigma^2 m} \quad \text{.....(2)}$$

β: Beta coefficient

Cov (Rs,Rm): Covariance between the return on the securities and the market return.

Rs: Securities return

Rm: Market return

$\sigma^2 m$: R_m contrast to the market return.

Accordingly, investors use beta coefficient to construct their portfolios and to evaluate the investments opportunities to achieve higher returns on their investments.

2.1.2 Assumptions of the CAPM

Given sufficient complexities, to understand the real world and construct models, it is necessary to assume away those complexities that are thought to have only a little or no effect the its behavior. The CAPM is associated with key assumptions that represent a highly simplified and natural world. Generally it is accepted that the validity of a theory depends on the empirical accuracy of its predictions rather than on the realism of its assumptions. The major assumptions of the CAPM are (Petros, 2010):

i. All investors aim to maximize the utility they expect to enjoy from wealth holding.
ii. All investors operate on a common single-period planning horizon.
iii. All investor's select from alternative investment opportunities by looking at expected return and risk.
iv. All investors are rational and risk-averse.
v. All investors arrive at similar assessments of the probability distributions of returns expected from traded securities.
vi. All such distributions of expected returns are normal.
vii. All investors can lend or borrow unlimited amounts at a similar common rate of interest.
viii. There are no transaction costs entailed in trading securities.
ix. Dividends and capital gains are taxed at the same rates.
x. All investors are price –takers: that is, no investor can influence the market price by the scale of his or her own transactions.
xi. All securities are highly divisible, i.e. can be traded in small parcels.

2.2 Review of the empirical evidence

The Capital Assets Pricing Model (CAPM) is the most famous asset pricing model in finance literature. It states that the return of a stock is influenced by only one single

factor, i.e. the return on the market. The risk of an asset can be measured by its responsiveness to that single factor. If the systematic risk and return relationship implied in this basic model could be validated in real world stock markets that would be a true revolution in finance (Bilgin and Basti, 2014).

(Lintner, 1966; Douglas, 1969) were the earliest ones who conduct tests of CAPM on individual stocks in the excess-return form. They have found that the intercept has values much larger than the risk-free rate of return, while the coefficient of beta is statistically has a lower value, though it is statistically Significant and the residual risk affect asset returns. Early studies of CAPM based on the individual security returns do not have supporting evidence. Miller and Sholes (1972) encountered the same problems when applying the model on the individual asset returns.

After the introduction of CAPM model, many researchers conducted several studies to test the validity of CAPM; some of these studies supported the CAPM (Jacob, 1971; Fama & MacBeth, 1973), while others did not support the model (Tinic & West, 1984; Fama & French 1992 and 1993). Fama and French (1992) provide evidence that CAPM has no ability to predict stock returns depending on beta coefficient; the results of their study showed that, additional factors besides beta effect company return such as, company size, book -to- market ratio.

Extending the Black, Jensen and Scholes (1972) study, Fama and MacBeth (1973) provided evidence of a larger intercept term than the risk-free rate, that the linear relationship between the average return and the beta holds and that the linear relationship holds well when the data covers a long time period. Fama and McBeth (1973) explained that the coefficient of beta is statistically significant and its value has remained small for many sub-periods. Fama and McBeth (1973) have validated the CAPM on all stocks listed on NYSE during 1935- 1968, while Tinic and West (1984) found that residual risk has no effect on asset returns, however, their intercept is greater than risk-free rate and the results indicate that CAPM might not hold. Similarly, Kar, Wai-kam and David (1982) found that all the three approaches (Sharpe and Cooper, BJS, and Fama and McBeth) seem to point out that the CAPM is verified in its simplest form. Beta does account for the deviations of the returns and the residual term also explains some of the observations.

Sauer & Murphy (1992) have confirmed that CAPM is the best model for describing the German Stock Market data. In a more detailed study Hawawini (1993) could not confirm the validity of CAPM in equity markets in Belgium, Canada, France, Japan, Spain, UK and USA. The other studies which have tested CAPM for different countries include Lau *et al.* (1975), for Tokyo Stock Exchange, Sareewi, Wathana & Molone (1985) for Thailand Stock Exchange and Bark (1991) for Korean Stock Market. Another response is that empirical inadequacy of standard CAPM may be due to a number of unexplained patterns in asset returns that has resulted to use attribute sorted portfolios of stocks to represent the additional risk factor in the standard model. The most prominent work in this regard is series of papers by Fama and French (1992, 1993, 1995, 1996, 1998 and 2004).

Campbell (1996) proposes an inter-temporal model in which an asset's risk premium is a function of the market portfolio's risk premium, of variables used for predicting future returns and the return on human capital. He uses vector auto regressive (VAR) models and finds a positive relationship between risk and return. Brandt & Kang (2004) also estimate a VAR model that is capable of identifying both the conditional risk-return relationship, and the non-conditional relationship. The authors conclude that, although the non-conditional relationship is positive, the conditional relationship is negative and statistically significant. In their view, the difference between the conditional and the non-conditional relationships may explain the divergence of results found in the literature. Ghysels *et al.* (2005) find a positive and significant relationship using a different estimator for the covariance matrix: Mixed Data Sampling (MIDAS). They argue that it is a more powerful estimator than the GARCH methodology. In fact, using GARCH models the authors do not find statistical significance in the risk-return trade off. Other papers that obtain a positive inter-temporal relationship between risk and return, with similar methods include: (Scruggs, 1998; Garcia & Bonomo, 2001; Chen, 2002; Guo & Whitelaw, 2006; Bali & Peng, 2006; Aquino, 2006; Lundblad, 2007; and Bali, 2008). Other examples of papers that obtain a negative relationship are: (Campbell, 1987; Nelson, 1991; Whitelaw, 1994).

Campbell and Cochrane (1999) propose a habit model where the utility of consumption is a function of current consumption relative to recent-past consumption.

Calibrating the model to post-war U.S. data and simulating artificial data under the model, they show that their habit-persistence model is capable of producing many of the asset-pricing phenomena observed in prior empirical work. Subsequent empirical testing of CC's model in international markets suggests that, while it offers improved goodness-of-fit, the model's ability to explain the stock returns varies across countries. (Hyde and Sherif, 2005; Engsted, Hyde, and Moller, 2007).

Scheicher (2000) researched on 12 companies listed on German stock exchange for the period of 23 years. He found that the expected return was not just predicted by a single risk factor. There are some other factors also affecting the returns of investments. He concluded that the results of other models like multi risk factor model and GARCH model more accurately predicts the expected return of investments on stock than CAPM model. Similarly, Gomez and Zapatro (2003) analyzed the data of 220 US securities covering period of twenty six year from 1973 to 1998. They used two betas model considering the systematic market risk factor and active management risk factor. They concluded that the result of their two betas model is better than CAPM.

Ocampo (2004) tested the validity of CAPM in Philippine equity market showed that validity of CAPM through traditional approach is not applicable in explaining the relationship between beta and return, while using conditional approach, the results proved significant effect of beta in explaining stock return. Similarly, Grigris*etal. (*2006) tested the validity of CAPM in Athen's securities market showed that portfolios with high beta did not earn high returns, and the intercept (α) of the model is not equal to zero, which means that CAPM is not valid in explaining the relationship between risk and return in Athen's security market.

Grigoris and Stavros (2006) found that the basic statement or assumption of high return on high risk does not fulfill on Greek stock market. They used data of 100 companies of Athens stock exchange covering the period of five years from 1998 to 2002. They also conclude that the results of CAPM are consistent for shorter period but overall the CAPM does not provide accurate and consistent results. Hui and Christoper (2008) used the data of 95 companies of United States and Japan stock markets for the period of 11 years from 1996 to 2006. They found that CAPM model does not provide accurate and consistent results when applied to stock markets of

Japan and United States.

Yang and Donghui (2006) tested CAPM in the Shanghai stock exchange during 2000 – 2005. They used weekly stock returns from 100 companies, methods of time-series test and cross-sectional test were used, and they found linear relation between expected returns and betas, which implies a strong support of the CAPM hypothesis. But in testing the intercept and the slope, the results proved that CAPM is not valid in Chinese stock market.

Choudhary and Choudhary (2010) tested the validity of CAPM in India equity market found that (1) higher risk (beta) is not associated with a higher level of return and this result donot Support the CAPM theory. (2) The CAPM's prediction for the intercept and the slope of the equation is contradictory with the CAPM hypothesis. (3) The relationship between beta and expected return is linear.

Loukeris (2009) tested the validity of CAPM in London stock market for the period 1980 – 1998 by using two step regression procedures of 39 stocks; the results showed that the cross section of average excess security return is positively related to beta. But when using the two step regression procedure into CAPM, the result showed that the slope of the security market line is different from the slope of SML indicated by CAPM, which means that CAPM hasn't a statistical significance in portfolio selection.

Bilgin and Basti (2011) tested the validity of CAPM in Istanbul stock exchange during 2006– 2010 for 42 company stock, they adopted Fama and McBeth's (1973) unconditional testing approach, and they used monthly returns of stock. Their results indicated that there is no meaningful relationship between betas and risk premiums, which means CAPM is not valid in (ISE). Their further investigation on 2014 by considering but conditional and unconditional approach of CAPM found that unconditional CAPM is rejected for the sample period, while the test of conditional CAPM indicated a statistically significant conditional relationship during some sub-periods. But since the relationship between risk and return in up and down markets is not symmetric, this conditional relationship does not indicate a positive relation between risk and return, according to these results, CAPM may not be a useful tool to measure the relationship between risk and return in ISE.

Khan *et al.* (2012) tested the CAPM in Pakistan stock exchange during the period 2006 - 2010 by using ten companies stock, they calculated beta of each company and its expected return, then they compared the expected return with the actual return, their results indicated that CAPM is not applicable to Pakistanian stock exchange. Similar result was found by the Demircioglu (2015) in Turkey Cement Sector and Power Generation and Distribution Sector.

In Nepalese context there were also some studies had been made to determine the applicability of the CAPM model on NEPSE? Poudel (2002) study on risk return assessment of commercial banks showed that the individual stock's beta coefficient helps determine the minimum rate of return required by the investor to compensate for systematic risk. On the other hand, Kiran (2010) found that the CAPM does not provide a valid framework to predict common stock returns on the NEPSE for the total sample period of 1998 to 2008. In a monthly basis analysis, the researcher found that small number of months with a significant relationship between average return and risk, only about 32%. In a yearly basis analysis, there was a significant relationship between risk and return only in the years 2004 and 2008. Joshi (2005) postulated that to existence of calendar anomalies is becoming non-existent which indicated that market is behaving weakly efficient in recent years. This would suggest that more sophisticated models to understand risk return trade off of Nepalese Capital market would be imperative. This indicates that the relevance of CAPM is a matter of academic debate and unsolved riddle in the case of Nepalese Capital Market as well.

Table 2.1

Summary of Empirical Studies on Validity of CAPM Model

Author	Period	Methodology	Findings
Kar, Wai-kam, David (1982)	1974 - 1982	chi-square, Sharpe and Cooper, BJS, and Fama and Mcbeth	All the three approaches (Sharpe and Cooper, BJS, and Fama and McBeth) seem to point out that the CAPM is verified in its simplest form. Beta does account for the deviations of the returns and the residual term also explains some of the observations.
Scheicher (2000)	1973 - 1998	Regression Equation and GARCH model	Study found that the expected return was not just predicted by a single risk factor. There are some other factors also affecting the returns of investments. Study concluded that the results of other models like multi risk factor model and GARCH model more accurately predicts the expected return of investments on stock than CAPM model.
Theriou. N and et.all (2003)	1987 - 2001	Black, Jensen and Scholes-BJS approach	The traditional CAPM is not verified in the ASE for the study period. The inferences are quite different when testing Black's two factor model. Specifically, the hypothesis that the expected excess return on the beta factor should be significantly equal to zero, which would prove a consistency with the traditional CAPM, is not verified for all the periods of the analysis.
Ocampo (2004)	1992 - 2002	Traditional and conditional approach	The results showed that validity of CAPM through traditional approach is not applicable in explaining the relationship between beta and return, while using conditional approach, the results proved significant effect of beta in explaining stock return.
Petros, Jechech e (2005)	2003 - 2004	Black, Jensen and Scholes (1972), Fama and MacBeth (1973)	The study did not provide evidence that higher beta yields higher return while the slope of the security market line is negative and downward sloping. The data also provide a difference between average risk free rate, risk premium and their estimated values. However, a linear relationship between beta and return is established.

Grigoris and Stavros (2006)	1998 - 2002	Fama and MacBeth (1973	They found that the basic statement or assumption of high return on high risk does not fulfill on Greek stock market. They also conclude that the results of CAPM are consistent for shorter period but overall the CAPM does not provide accurate and Consistent results.
Yang and Donghui (2006)	2000 – 2005	Time-series test and cross-sectional test	They found linear relation between expected returns and betas, which implies a strong support of the CAPM hypothesis. But in testing the intercept and the slope, the results proved that CAPM is not valid in Chinese stock market.
CudiTuncerGuesyo, Gulnara Rejepova(2007)	1995 - 2004	Fama and MacBeth (1973),and Pettengil*et. al*.(1995) approaches	Research findings based on Fama & MacBeth approach indicated no meaningful relationship between beta coefficients andex-post risk premiums of the selected portfolios. With Pettengill et al. methodology, on the other hand, strong beta-risk premium relationships were discovered.
Raei and Mohammadi (2008)	1994 - 2005	Standard CAPM model	They concluded that methods of estimating expected return have been changed; CAPM is just useful for calculating cost of capital. They also found that the returns from CAPM models are always lower than compare to multi factor model (APT).They suggested that APT provide more accurate result compare to CAPM.
Eatzaz and Attiya (2008)	1993 - 2004	CAPM equation	They concluded that the results of CAPM model are consistent and accurate with only few securities and only for few years. They also found that multi risk factor model predicts more accurately results as compare to CAP model.
Loukeri s (2009)	1990 - 1998	Two step regression procedure	The results showed that the cross section of average excess security return is positively related to beta. But when using the two step regression procedure into CAPM, the result showed that the slope of the security market line is different from the slope of SML indicated by CAPM.

Alina (2009)	2003 - 2009	Regression equation	The results confirm that the intercept is statistically insignificant, upholding theory, for both individual assets and portfolios. The study does not necessarily provide evidence against CAPM, however other simulations can be built, more close to reality, improving the model and offering an alternative which also takes into account the specific conditions of local capital market and the global financial crisis consequences.
Choudhary, Kapil and Choudary Saksi (2010)	1996 - 2009	Black, Jensen and Scholes (1972) and Fama and MacBeth (1973)	The findings of this study are not substantiating the theory's basic result that higher risk (beta) is associated with higher levels of return. The model does explain, however, excess returns and thus lends support to the linear structure of the CAPM equation. The results of the study lead to negate the above hypotheses and offer evidence against the CAPM. The tests conducted to examine the nonlinearity of the relationship between return and betas bolster the hypothesis that the expected return-beta relationship is linear. Additionally, this study investigates whether the CAPM adequately captures all-important determinants of returns including the residual variance of stocks. The results exhibit that residual risk has no effect on the expected returns of portfolios.
Bilgin and Basti (2011)	2006 - 2010	Fama and McBeth's (1973) uncondition al testing approach	Their results indicated that there is no meaningful relationship between betas and risk premiums, which means CAPM is not valid in (ISE).
Syed, Raza and *et.al.* (2011)	2004 - 2011	Paired sample t- test	Results show that capital asset pricing model (CAPM) predict more accurately the expected return on a short term investment as compare to long term investment. It is recommended that the investors should more focus on CAPM results for short term as Compare to long term investments in KSE.
Khan *et. al.* (2012)	2006 - 2010	Compared the expected with the actual return	Their study indicated that CAPM is not applicable to Pakistanian stock exchange.

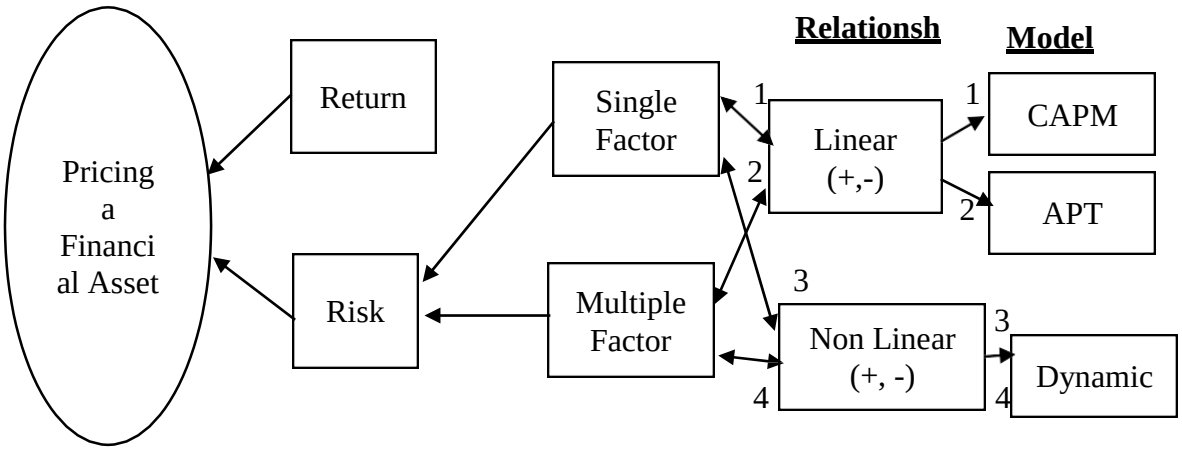
Lazar and Yaseer (2012)	2001 - 2009	Black, Jensen and Scholes (1972)	The analysis gives mixed result and could not find conclusive evidence in support of CAPM in the selected study period.
Bilgin and Basti (2014)	2003 - 2011	The unconditional and conditional versions of CAPM	Their results indicated that unconditional CAPM is rejected for the sample period, while the test of conditional CAPM indicated a statistically significant conditional relationship during some sub-periods. But since the relationship between risk and return in up and down markets is not symmetric, this conditional relationship does not indicate a positive relation between risk and return, according to these results, CAPM may not be a useful tool to measure the relationship between risk and return in ISE.
Demirciog lu, Emre (2015)	2012 - 2013	Regression analysis	The study found that Coefficients Beta and Capital Asset Pricing Model (CAPM) both of the sector shows In-significant result, which means the Capital Assets Pricing Model (CAPM) is not applicable in Turkey Cement Sector and Power Generation and Distribution Sector.
Alqisie and Alqurra n , (2016)	2010 – 2014	Black, Jensen and Scholes (1972) and Fama and MacBeth (1973)	Results of the study leads to contradict the theory's assumption that beta coefficient is a good toll to predict the relationship between risk and return; hence the beta coefficient of some portfolios in the three sub periods was not significant. In addition, the results of testing SML violated the CAPM assumption in the three sub periods that, the slope should be equal to the average risk premium. Finally, tests of non-linearity of the relationship between return and betas validated the CAPM hypothesis, that the expected return-beta relationship is linear.
Depending on the above results, we could not find conclusive evidence in support of CAPM in ASE.			

2.3 Theoretical framework

Modeling risk-return has been attempted in the field of finance since the Markowitz Mean- Variance Theorem. The risk return tradeoff models, which are also referred as asset pricing models, since then have travelled along way to reach the present stage with plethora of sub- areas including prominence in static and dynamic versions. The risk-return relationship for asset pricing is shown in figure 1.

Conventional CAPM and APT are static pricing models with difference that CAPM is a single factor risk assessment model whereas APT incorporates multifactor risk in pricing assets. However, major limitation of APT lies in the fact that there is no congruence among researchers regarding which are the factors that are to be considered in this multiple factor evaluation. The linear CAPM model assumes both positive and negative relation with market return depending on the nature of asset. Non-linear models incorporate influence of higher order moments in addition to mean and variance of market return. Non-linear models can be both: time-varying and time stationary and single as well as multiple factors.

Figure 1 *Risk-return relationship for asset pricing*



Source: Koirala Santosh (2015)

It is clear from figure that CAPM ability to explain the pricing of model is limited in that it is linear as well as single factor version of asset pricing and does not takes into account influence of multiple factors, non-linearity and time varying dynamic effects. The limitation lies in proposed model to not taking the account of multiple factors. The major empirical studies that have been conducted in corporate finance, especially in regard to stock prices and risks, static vis-à-vis dynamic versions of CAPM which would capture best the variation in financial assets returns. These literatures presented in table 2.2 provide a basic foundation to this study.

Table 2.2

Theoretical Development of CAPM.

	Model	Originators
STATIC	Markowitz mean Variance Theorem	Markowitz(1952,1959)
	Sharpe-Linter CAPM	Sharpe(1964),Linter(1965), Mossin (1966)
	Black Zero beta CAPM	Black(1972)
	CAPM with nonmarketable Human Capital	Mayers (1972)
	CAPM with Multiple Consumption Goods	Breeden (1979)
	International CAPM	Solnik (1974a, Adler and Dumas(1983)
	Arbitrage Pricing	Theory Ross(1976)
	Fama French Three Factor Model	Fama and French (1993)
	Partial Variance Approach Model	Hogan and Warren(1974), and Bawa and Linderberg (1977), Harlow and Roa (1989)
	Three moment CAPM	Rubinstein (1973), Kraus and Litzenberger(1976)
	Four Moment CAPM	Fang and Lai (1997) and Dittmar (1999)
DYNAMIC	The inter temporal CAPM	Merton (1973)
	The Consumption CAPM	Breeden (1979)
	The Production Based CAPM	Lucas (1978),Brock (1979)
	Investment Based CAPM	Cochrane (1991)
	Conditional CAPM	Jagannathan and Wang (1996)
	Liquidity Based CAPM	Acharya and Pedersen (2005)

Source: Celik, Saban (2012)

For the determination of theoretical framework and for selection of variables for the study, previous studies have been referred. The theoretical model for the capital assets pricing model and consumption capital assets pricing model are as following.

2.3.1 Theoretical framework for CAPM model

The theoretical framework for this study is derived from the studies carried out by (Ocampo, 2004; Yang and Donghuli, 2006; Bilgin and Basti, 2011; Idolor and Joseph, 2010; Choudhary and Choudhary, 2010; Lazar and Yasheer, 2010; Khan *et. al.,* 2012). In this the dependent variables is excess of return and market risk premium is the independent variable. Theoretical framework for CAPM model has been presented in figure 2.

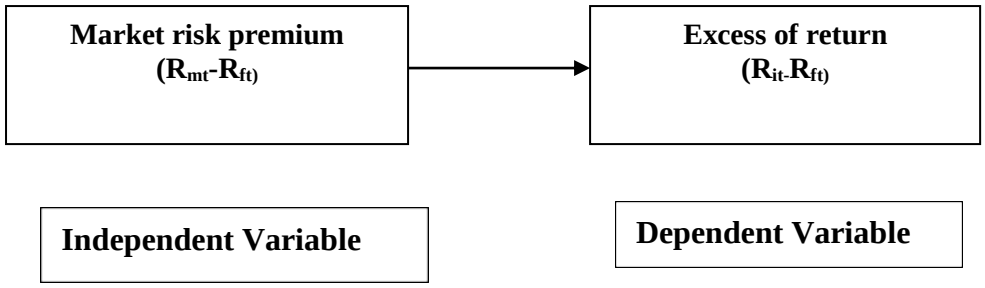


Figure 2 *Theoretical models for the CAPM model*

Source: Yang and Donghuli (2006)

CHAPTER III
METHODOLOGY

This chapter presents all the necessary steps that have been followed throughout the research work in order to achieve and accomplish the stated objective of the study. This chapter focuses on the framework of the research design, sample selection and size, hypothesis, data collection procedure, data processing, definition of variables, meaning and definition of statistical tools used. This chapter highlights the research methodology used for the study.

3.1 Research design

The research design adopted in this study is descriptive and casual comparative research design. Descriptive research design is helpful in organizing, tabulating, depicting and describing the data collected. Casual comparative research design helps to investigate the possible causes affecting dependent variable excess of return by observing existing consequences and searching for the possible factor leading to these results. This design helped to study the situation in order to explain the relationship between dependent and independent variables of CAPM model. Thus, the research design for the study is descriptive and casual comparative research design.

3.2 Population and sample

The total number of companies i.e. 212 companies listed in Nepal Stock Exchange in the beginning study period comprises the population of this study. The companies which meet following criteria have been chosen as sample companies for the study.

i. The Company must have regular trading except in the book close time during the study period to prevent the use of illiquid assets. The company with closing price for of 108 months, the company with closing price for 108 month has been selected for the study and for the data analysis those month whose closing price are not available the last month closing price has taken for the calculation.
ii. Company didn’t have new opening price for its stock as a consequence of private underwriting.
iii. The company should not have split or reverse split their shares during the study period.

iv. Company must not be exposed to the merger during the study period.

Twenty nine company supporting sampling criteria has become the sample for study.

3.3 Nature and sources of data

This study is based on secondary data. The official site of the NEPSE has systematic record of monthly data from 2011 onwards so this study has used data of the period of nine (9) years, from 2011-01-01 to 2019-12-31. The study has used the monthly closing stock prices to calculate the rate of return of each stock, and the monthly closing values of Nepal Stock Exchange index as proxy for the market return. Both monthly stock prices and NEPSE index values are taken from official website of NEPSE. Furthermore, the returns on 6 months treasury bills of government of Nepal central bank has been taken as risk free for the years (2011-2019). The official site of Nepal Rastra Bank has been used to take data of T-bill rate.

3.4 Data analysis method and tool

The study has used following method and tools to analyze and interpreted the results.

3.4.1 Descriptive statistics

The descriptive statistics are calculated for CAPM model variables. Study has used the descriptive statistics measures, such as measures of dispersion (S.D, minimum, maximum) and central tendency (mean, median) that are used to describe data set.

3.4.2 Regression analysis

Regression analysis has been used to find the effect on the excess of return on constructed portfolio when there is change in independent variables i.e. market risk premium. Adjusted R square value indicates the resultant predictive ability of the model due to the addition or subtraction of independent variables into the model. The p value has been used to find out whether the overall regression model is statistically significant or not. If the p value is less than .05, then it indicates that the model is significant. F-test has been used to shows the fitness of the model used in the study.

3.4.3 Software used

The data used in this study were first tabulated in Microsoft Excel. The tabulated data were analyzed with the help of MS excel and SPSS software, a statistical tool for CAPM model for analyzing data. All the tables and figures have been generated using

the MS Excel and SPSS software.

3.5 Models for the study

In order to test the applicability of CAPM, this study has adopted the models of Black et al (1972) which was conducted through grouping stocks into portfolios. According to Cochrane, (1991).Justification for grouping stocks into portfolios are;

(1) Using individual stock betas will create a problem of error measurement which will lower regression coefficients.
(2) Individual betas vary over the time as the size, leverage and risk of business change.
(3) The individual stock return is so volatile that study can't reject the hypothesis that all average returns are the same.
(4) Portfolio betas are better measured because the portfolio has lower residual variance.

3.6 Process of testing CAPM

The test of CAPM with portfolios can be conducted in three steps:

First step:

First step starts with estimating beta coefficient for individual stock using monthly return through regressing each stock's monthly return against the market return according to the following equation:

$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + e_{it}$ …… (4) Where,

R_{it}: is the rate of return on asset i at time t,

$= (P_t - P_{t-1})*100/ P_{t-1}$

P_t = closing price of stock i for month t.

P_{t-1} = closing price of stock i for month t-1. R_{ft}: is the risk-free rate at time t.

α_i: is the intercept.
β_i: is the beta of stock i.

And

Rmt: is the rate of return on the market portfolio at time t,

$= (I_t - I_{t-1})*100/ I_{t-1}$

Where:

I_t = the index value in the end of month t.

I_{t-1} = the index value in the end of month t-1.

e_{it}: is the random disturbance term in the regression equation at time t.

The equation can be also express as follows:

$r_{it} = \alpha\ i + \beta_i r_{mt} + e_{it}$ …….. (5)

Where:

r_{it}: is the excess return of stock i, $=R_{it} - R_{ft.}$

r_{mt}: is the risk premium, $=R_{mt} - R_{ft}$..

α_i: is the intercept, and

βi: is the beta of stock i.

The study has used the percentage monthly return of company stock and the monthly market return in addition to the risk free return. Then, the study has regress the company stock return as dependent variable against the market return as the independent variable.

Second step

In the second step the study has construct the portfolios by using the calculated beta through arranging the individual beta for each stock in the sample on ascending order, and then stocks were grouped into portfolios with 6 stocks each according to their beta. The first portfolio include 6 stocks with the lowest beta, and the second portfolio include the next 6 stocks with the second highest beta, and so for the other portfolios until the study reached portfolio 5 with the highest beta. Also, the study divided the sample period for eight sub periods and one hold period.

Table 3.1

Period Range, Portfolio Formation, and Testing Period

Period	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Period Range	2011	2012	2013	2014	2015	2016	2017	2018	2019
Portfolio Formation	2011	2012	2013	2014	2015	2016	2017	2018	2019
Testing Period	2011	2012	2013	2014	2015	2016	2017	2018	2019

In this step the portfolios betas were calculated by using the following model: $R_{pt}= \alpha p + \beta p\ r_{mt}+e_{pt}$ …….. (6)

Where:

R_{pt}: is the average excess portfolio return on time t, = Σ Rs / N. where:

Rs: is the average monthly return for stock s (s = Number of stock in portfolio)

βp : is the estimated portfolio beta,

r_{mt}: is the risk premium and

e_{pt}: is the error term in the regression equation at time t.

Third Step

In the third step following calculating the portfolios beta the study estimate the ex post security market line for each testing period by regressing the portfolio return against portfolio betas as follows:

$r_p = \lambda_0 + \lambda_1\beta_p+e_p$ …… (7)

Where:

r_p: is the average excess return of portfolio p.

β_p: is the beta of the portfolio P,

e_p: is the error term in the regression equation.

The theory says that if the CAPM is true, the intercept (λ_0) should be equal to zero and the slope SML (λ_1) is the average risk premium of the market portfolio. The study has also test the non-linearity between the total portfolio returns and its beta by using the following equation:

$r_p= \lambda_0 + \lambda_1\beta p + \lambda_2\beta^2_p +e_p$ …… (8)

According to the theory, if the CAPM is true, the portfolio returns and its beta are linearly related with each other and (λ_2) will be equal to zero.

CHAPTER IV

RESULTS

This chapter covers descriptive statistics, regression analysis of CAPM model results and findings of the study. The results based on models are discussed as under:

4.1 Year wise distribution of beta (β).

The beta for individual securities by using time series regression model were calculated for different year which is displayed in table 4.1.The result shows that the range of estimated beta for the year 2011 is in between -0.026 minimum and the maximum 1.790. The range of beta for the year 2012 is in between -0.019 and 2.494 and for the year 2013, the beta lies between -0.154 minimum and2.992 maximum.

The range of beta for the year 2014 shows that the minimum beta is -0.029 and the maximum is 1.307 and the beta for the year 2015 lies between -0.013 minimum and 3.049 maximum. For the year 2016 the minimum beta is 0.000 and the maximum 2.226, for the year 2017 the range of beta is in between –0.009 and 3.982 and for year 2018 is between –0.135 and 3.877. For the year 2019 the range beta is in between -0.065 and 2.039.The range beta for whole year is minimum -0.124 and maximum 1.561. Here, the study observed the variation in the range of beta in different Year.

4.2 Average excess portfolio return and beta

Different year shows that combining securities into portfolios has definitely help to diversify the risks due to the firm specific factors and enhance the precision of estimates of beta and the expected return on the portfolios. At this stage of the study, the portfolios are constructed by using the calculated betas. The same procedure is repeated for the whole sample year, for the adjusted year and also for different year. The average excess return was calculated for each portfolio and the following regression model - 7 is used to calculate the portfolio beta. On the basis of the regression results the CAPM is tested for different Year.

4.2.1 Year 2011

The NEPSE index for the year 2011 is noted 403.12 in the beginning and it was 323.62 at the end of study period the total loss in the index was 79.5 points during this period. Return from the market portfolio is -19.722%. Thus the study found that all

portfolios earn more than the market return in this year.

Table 4.1

Sample Companies Beta during different year

Company	BETA									
	Year									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2011-2019
Nabil Bank Limited	1.744	1.337	0.468	1.307	1.962	0.812	0.775	0.532	0.537	1.053
Nepal Investment Bank Limited	1.410	1.458	0.668	0.574	2.973	0.438	0.578	0.002	0.425	0.947
Standard Chartered Bank Limited	1.445	1.520	0.906	1.293	2.480	2.226	0.944	0.429	0.899	1.349
Himalayan Bank Limited	1.727	1.900	0.913	0.275	2.637	1.597	0.840	0.500	0.439	1.203
Nepal SBI Bank Limited	0.999	1.706	0.976	0.779	3.049	1.046	1.590	0.649	0.918	1.301
Nepal Bangladesh Bank Limited	0.703	1.602	1.996	0.676	1.699	1.448	-0.252	0.676	0.427	0.997
Everest Bank Limited	0.630	0.476	1.115	1.089	2.499	1.649	1.005	0.949	0.672	1.120
Bank of Kathmandu Ltd.	1.790	1.942	1.397	-0.029	0.400	0.325	0.854	1.120	0.495	0.921
Machhapuchhre Bank Limited	1.340	1.821	2.727	0.444	0.458	1.370	0.949	1.166	0.534	1.201
Laxmi Bank Limited	1.305	1.494	2.116	0.939	0.880	1.032	-0.592	0.940	0.690	0.978
Kumari Bank Limited	1.709	2.072	2.992	1.099	0.515	0.056	0.481	1.035	-0.186	1.086
Nepal Credit And Commercial Bank Limited	0.200	1.414	2.447	0.950	0.490	0.000	1.133	1.539	0.804	0.997
Siddhartha Bank Limited	1.697	2.494	2.662	1.266	1.264	0.553	1.600	1.423	0.444	1.489
Soaltee Hotel Limited	0.409	-0.322	-0.434	0.125	0.098	1.148	0.876	1.047	0.917	0.429
Taragaon Regency Hotel Limited	-0.133	-0.019	-0.154	0.447	-0.184	0.917	1.140	0.540	0.022	0.286
Oriental Hotels Limited	-0.227	0.047	0.583	0.745	-0.031	1.014	1.223	1.821	2.039	0.801
Nepal Doorsanchar Company Limited	0.477	0.901	0.750	0.195	0.302	0.066	0.160	0.714	0.411	0.442
Bishal Bazar Company Limited	0.067	-0.099	-0.234	0.051	-0.102	0.000	-0.009	-0.493	-0.292	-0.124
National Life Insurance Co. Ltd.	-0.506	1.143	1.902	0.774	0.942	1.618	1.340	1.451	0.502	1.019
Nepal Life Insurance Co. Ltd.	0.267	1.101	2.088	0.434	0.718	1.548	0.946	0.370	-0.147	0.814
Life Insurance Co. Nepal	-0.209	1.215	0.700	1.112	1.103	1.003	1.655	1.185	1.287	1.006
Asian Life Insurance Co. Limited	0.405	0.425	2.431	0.671	0.492	1.001	1.346	2.668	0.332	1.086
Prime Life Insurance Company Limited	0.935	1.466	2.247	1.155	0.374	1.215	2.184	3.877	0.594	1.561
Surya Life Insurance Company Limited	0.570	1.071	1.717	1.186	0.052	1.226	3.982	0.597	1.363	1.307
Gurans Life Insurance Company Ltd.	0.011	1.550	1.754	0.968	0.100	1.692	3.225	1.862	0.464	1.292
Citizen Investment Trust	-0.786	0.166	0.617	-0.177	-0.013	0.840	1.044	2.143	0.601	0.493
United Finance Ltd.	-0.060	0.375	1.267	0.098	1.948	1.894	1.098	-0.135	0.151	0.737
Shree Investment Finance Co. Ltd.	0.261	0.721	1.385	-0.079	0.268	0.000	0.299	0.473	-0.065	0.363
Janaki Finance Ltd.	-0.026	1.110	0.290	0.461	0.353	0.882	1.110	0.875	-0.156	0.544

From the table 4.2, it is clear that portfolio 1 (P1) with lowest beta earn lower return than the return of portfolio 5 (P5) with higher beta. Which means this two portfolio satisfy the concept of CAPM higher the risk will contribute higher return. But this argument of CAPM is violated by the rest other portfolio P2, P3 and P4 which can be

clearly identify through the result of the table.

The value of R^2 for the first three portfolios is between 0.014 and 0.182, which indicates very weak correlation with the market index. But for the portfolio 4 and 5, the values of R2 are 0.585 and 0.700 respectively.

Table 4.2

Portfolio return and portfolio beta for the year (2011)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	-2.829	-8.112 (0.000)*	-0.120 (0.360)	0.014	0.850	0.360
P2	-2.981	-6.111 0.002	0.243 0.174	0.026	1.890	0.174
P3	-1.179	-3.491 0.002	0.382 0.000	0.182	15.560	0.000*
P4	-3.013	-0.699 0.588	1.162 (0.000)*	0.585	98.574	0.000*
P5	-2.017	1.337 0.247	1.338 (0.000)*	0.700	163.621	0.000*

** Shows significant at 5% level.*

This indicates that about 58.50% and 70% of the variation in the scrip has been explained by the relationship with the index for the portfolio 4 and 5 respectively. Further from table 2 it is clear that alpha coefficient is significantly not different from zero in 1% level of significance but in case of 5% level of significance portfolio P1 has alpha coefficient significantly different from zero. This means we accept the null hypothesis of intercept term is zero except for portfolio P1 in 5% level of significance. Furthermore the estimated betas of the portfolios (P1, P2 and P3) are found to statistically insignificant in 95% level accepting the null hypothesis beta is not the significant determinant of portfolio return. But statically significant result of beta for portfolio P4 and P5 conclude that the beta is significant determinant of portfolio return. Thus the study found inconclusive and contradictory; hence the beta can't be used for predicting the relationship between risk and return in NEPSE for the year 2011.

4.2.1.1 Estimation of security market line

The result for the first sub period is shown in the table 4.3 and it is clear that the test accept the null hypothesis that λ_0 is not significantly different from zero. Statistically, the p-value is statically insignificant at 95% confidence level and hence λ_0 statistically consistent with CAPM.

Table 4.3

Result of test of SML

	Coefficients	**Standard error**	**t-value**	**p value**
λ_0	-1.587	0.636	-2.495	0.088
λ_1	-0.764	0.518	-1.476	0.236

Further from table 4.3 it is clear that $\lambda_0$is negative (-1.587) and it is nearly equal to zero and absolute p-value is greater than 0.05, this means that λ_0 is not significantly different from zero. But as per CAPM the $\lambda_0$should be greater than zero, there by the result is inconsistent with CAPM hypothesis.

4.2.1.2 Test of non-linearity

The result of the non-linearity test for year 2011 is summarized below in table 4.4. The result shows that the values of the intercept are 1.302 and it is not significantly different from zero. Statistically, the p-value is 0.607 and is greater than 0.05, hence the study accept the null hypothesis that $\lambda_2$is not significantly different from zero. Thus, it is consistent with the argument of CAPM.

Table 4.4

Result of test of non-linearity

	Coefficients	**Standard error**	**t-value**	**p value**
λ_0	-2.267	1.335	-1.698	0.232
λ_1	-0.749	0.583	-1.284	0.328
λ_2	1.302	2.156	0.604	0.607

In the case of λ_0, p-value is not significant at 95% confidence level. So, it is significantly not different from zero. As per CAPM, the λ_0 should be equal to the average risk premium hence the study concludes that result is inconsistent with CAPM hypothesis. The value of λ_1 is -0.749 and p values shows it is not significantly

different from zero at 5% level of significance. Hence, it is inconsistent with CAPM hypothesis. As λ_1 is not significantly different from zero. Thus, this study can clearly reject CAPM during this year.

4.2.2 Year 2012

The year 2012 covers the monthly data of 29 Sample Company from January 2012 to December 2012. Further, in the beginning of the year NEPSE index was 322.19 and it was 529.69 points at the end of this year. The total gain in the index was 207.5 points showing very increment in index point than that this year. The market return in this year is 0.6440.

Table 4.5

Portfolio return and portfolio beta for the sub period (2012)

Portfolio	**Portfolio Return (rp)**	**Constant**	**Beta**	**R^2**	**F-value**	**Sign.**
P1	2.910	-1.387 (0.264)	0.500 (0.033)	0.063	4.722	0.033
P2	5.225	1.085 (0.527)	0.785 0.017	0.095	6.060	0.017
P3	8.639	4.656 (0.015)	1.070 0.003	0.119	9.411	0.003
P4	20.682	16.956 (0.167)	1.537 0.501	0.06	0.457	0.501
P5	6.193	2.496 (0.014)*	1.587 (0.000)*	0.512	73.396	0.000*

** shows significant at 5% level*

During the study period all the portfolios including the portfolio with lowest beta earn more return than market return. The positive constants suggest that the portfolios have earned higher returns than the CAPM has predicted.

The value of R^2 for portfolio P1, P2 and P3 is between 6.3% and 11.9% indicating less than adequate correlation with the market index. But in the case of portfolio P4 and P5 nearly 6%and 51.2 % of the variation in return is explained by the relationship with the index. The test for alpha shows that the values of the constant are not significant

except in portfolio P5 at 99% level of confidence. Which indicates that null hypothesis is accepted i.e. the value of alpha is not significantly different from zero for portfolio P1, P2, P3 and P4. The result in this year is quite interesting that portfolio with lower beta has maximum return and vice versa. Furthermore estimated betas of portfolio P1 and P2 are statistically insignificant and betas of portfolio P3, P4 and P5 are found to be statistically significant at 95% and 99% level of significant so the study accept the null hypothesis that the portfolio beta is not significant determinant of portfolio return for P1 and P2. But study reject same null hypothesis for the portfolio P3,P4 and P5.Thus analysis provide contradict and inconclusive result so beta cannot be consider as predict risk and return relationship in NEPSE in year 2013.

4.2.2.1 Estimation of security market line

From the table 4.6, it is clear that the p–value accepts the null hypothesis at 95% confidence level that λ_0 is not significantly different from zero. Which means the portfolios uncorrelated with the market return has return equal to risk-free return.

Table 4.6

Result of test of SML

	Coefficients	Standard error	t- value	p value
λ_0	5.374	4.604	1.167	0.327
λ_1	5.583	5.616	0.994	0.393

Statistically, the result shows p-value is insignificant at 95% level, hence the result support the CAPM. Further looking into the table it is clear that the λ_1 is positive 5.583 and it is p-value shows it is statistically insignificant at 5% significant level. This means λ_1 is not significantly different from zero. But as per CAPM the λ_1 should be greater than zero, there by the result is consistent with the CAPM hypothesis and the model is fully accepted during the year.

4.2.2.2 Test of non-linearity

While testing the non- linearity, as per the CAPM the λ_0 and λ_1 will be equal to zero and the λ_1 should be equal to the average risk premium. The results of the estimated values are summarized below in the table 4.7.

Table 4.7

Result of test of non-linearity

	Coefficients	Standard error	t-value	p value
λ_0	-1.095	15.044	-0.073	0.949
λ_1	3.318	8.185	0.405	0.724
λ_2	8.577	18.637	0.460	0.691

The result shows that the intercept term is -1.095 of the model which is statistically not different from zero as p-value is higher than 0.05. So, the study cannot reject null hypothesis. Thus, it is consistent with the CAPM hypothesis. In the case of λ_1, p-value is 0.724 which is higher than 0.05 which means null hypothesis is accepted which means λ_1 is not significantly different from zero. As per CAPM, the λ_1 should be equal to the average risk premium; hence the study concludes that result is inconsistent with the CAPM hypothesis. The value of λ_2 is also not significantly different from zero at 5% level of significance as p- value is higher than .05. Hence the study concludes that it is consistent with the CAPM hypothesis. Thus, the relationship is linear and the data is good to explain the CAPM during the year.

4.2.3 Year 2013

Year 2013 also consists 29 sample companies' monthly data from 2013 January to 2013 December. In this year the NEPSE index was noted as 530.11 points at the beginning and it was 787.05 points at the end. The total gain in the index during the period was 256.94. Investor had received return 0.4847 from the market portfolio.

From Table 4.8, it is clear that beta of the portfolio increase from portfolio 1 to portfolio 5, but study does not observe such trend in portfolio return. But each portfolio has lower loss than the market gain of 0.4847. In this year on the portfolio with lowest beta earn positive returns because it is positively correlated with the market return. The above results completely contradicts the CAPM assumption of higher the risk higher the return. The positive value of alpha indicates that the

portfolio is earning high return than CAPM predicted. From same table 4.8, it is clear that the values of constants are statistically significant at 95% level for portfolio P1 and P2 and statistically insignificant for the remaining portfolio. Which indicates that null hypothesis about the Alpha term i.e. alpha is not significantly different from zero is rejected for Portfolio P1 and P2 and accepted for the Portfolio P3, P4 and P5. Further the estimates betas of the portfolio P1 and P2 are found to be statistically insignificant at 95% level but remaining portfolio beta is statically significant for this year.

Table 4.8

Portfolio return and portfolio beta for the year (2013)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	4.735	1.464 (0.417)	0.529 (0.091)	0.040	2.945	0.091
P2	2.792	0.651 (0.497)	0.988 (0.000)*	0.342	36.421	0.000
P3	4.844	2.887 (0.165)	1.062 (0.004)	0.135	9.078	0.004
P4	9.072	9.048 (0.000)*	1.848 (0.000)*	0.421	50.986	0.000*
P5	5.204	5.881 (0.165)	2.132 (0.000)*	0.614	111.503	0.000*

* *shows significant at 5%level*

Which indicates that beta cannot predict the risk and return relationship for portfolio P1and P2 but can predict the risk and return relationship for portfolio P3, P4 and P5. The value of R^2 for the portfolio except portfolio 5 lies between 0% to 45% indicating less than adequate correlations with market index. 61.4% of the variation in the scrip for portfolio 5 has been explained by the relationship with the market index.

4.2.3.1 Estimation of security market line

From Table 4.9, the value of the intercept is (-1.005). Statistically it is significant at 95% confidence level as p-value is lower than 0.05.

Table 4.9

Result of test of SML

	Coefficients	Standard error	t-value	p value
λ_0	6.431	3.229	1.992	0.140
λ_1	-1.005	2.750	-0.366	0.739

**shows significant at 95% level*

Which indicates that λ_1 is significantly different from zero. Thus result is inconsistent with CAPM. As per CAPM λ_0 should be equal to the average risk premium and here p-value shows the coefficient is not significantly different from zero at 5% level of significance but should be greater than zero. Hence, it is concluded that the result is consistent with the CAPM and hence there is mixed result and the study have conclusive evidence in support of CAPM in the year.

4.2.3.2 Test of non–linearity

The result for the year three is summarized in the table 4.10. The result displays that the intercept term for the model is (1.299). Statistically, λ_0 is different from zero as p value is less than 0.05. So null hypothesis of λ_0 is not significantly different from zero is rejected. This is inconsistent with the CAPM hypothesis.

Table 4.10

Result of test of non-linearity

	Coefficients	Standard error	t-value	p value
λ_0	1.299	2.630	0.494	0.670
λ_1	6.722	3.246	2.071	0.174
λ_2	-4.963	1.829	-2.713	0.113

**shows significant at 95% level*

In case of λ_1, p-value shows that null hypothesis rejected as it is lower than 0.05 which means λ_1 is significantly different from zero. The CAPM assumed that λ_1 should be equal to average risk premium, which should be greater than zero. This result is consistent with CAPM. The value of λ_2 is -4.963 and p-value declares it statistically different from zero at 5% significance level leading towards rejection of null hypothesis. So the result of the year doesn't give conclusive evidence for CAPM.

4.2.4 Year 2014

This sub period cover the monthly data of 29 Sample Company from 2014 January to 2014 December. In the beginning of this year the NEPSE index was 794.39 points and it was 939.53 points at the end of the year. The total gain in the index was 145.14 points. The return from the investment in the market portfolio was 0.1827. As market was in gain phase so each portfolio was attaining gain in this year.

From Table 4.11, it is easily traceable that the value of beta is increasing order but same is not a case for the portfolio return. Each portfolio has gain than market portfolio except for portfolio P4. The values of R2 are lies from 2.6% to 33 % for portfolio P1, P2 and P3 indicates less than adequate correlation with market index. But for portfolio P4 it is 0.413 indicating 41.3% of variation in the scrip has been explained by the relation with the market index. And 14.8% of variation is explained by market index for portfolio 5. All the value of the constants except portfolio P1 is statistically significant and negative. It indicates that alpha coefficient is significantly different from zero and hence the study rejects the null hypothesis that the intercept term is not significantly different from zero. Further the negative constants suggest that the portfolios earned lower returns than CAPM predicted. The p-values of estimated beta are found to be statistically insignificant for the portfolio P1, statistically significant for portfolio P2, P3, P4 and P5 at 95% of level of significance. Thus there is inconclusive result about the beta as predictor of return and risk in NEPSE in this year.

Table 4.11

Portfolio return and portfolio beta for the sub period (2014)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	3.6590	-0.048 (0.978)	0.254 (0.218)	0.026	1.549	0.218
P2	2.5512	-0.416 (0.728)	0.471 (0.001)	0.136	11.051	0.001
P3	0.5827	-1.440 (0.183)	0.749 (0.000)	0.330	34.555	0.000
P4	-0.7011	-2.490 (0.013)	0.817 (0.000)	0.413	49.241	0.000
P5	5.0201	3.475 (0.109)	0.889 (0.001)	0.148	12.203	0.001

**, ** shows significant at 5% and 10%level*

4.2.4.1 Estimation of Security Market Line

Table 4.12 shows the result for the year 2014 and it is clear that the test rejects the null hypothesis that λ_0 is significantly different from zero as p-value is higher than 0.05. Here the value of the intercept term is (1.857) and it is significantly different from zero. Hence the λ_0 is statistically inconsistent with CAPM.

Table 4.12

Result of test of SML

	Coefficients	Standard error	t-value	p value
λ_0	1.857	2.891	0.642	0.566
λ_1	0.279	2.010	0.139	0.899

**shows significant at 95% level.*

Further from the table it is clear that λ_1 is 0.279. The null hypothesis is accepted as p-value is higher than 0.05. So, λ_1 is statistically not significantly different from zero which means it is inconsistent with CAPM hypothesis.

4.2.4.1 Test of non-linearity

The results of the estimated values for the test of non-linearity are summarized in the table

4.13. The result shows that the intercept (2.667) of the model is λ_0 is significantly different from zero. Statistically, the p-value is (0.190) which is higher than 0.05 and there by null hypothesis is accepted. Thus it is not consistent with the CAPM hypothesis.

Table 4.13

Result of test of non-linearity

	Coefficients	Standard error	t-value	p value
λ_0	2.667	1.363	1.956	0.190
λ_1	2.208	1.088	2.029	0.180
λ_2	-2.424	0.703	-3.451	0.075

**shows significant at 95% level.*

In the case of λ_1, the p-value shows λ_1 coefficient is not significantly different from zero. As per CAPM, the λ_1 should be equal to the average risk premium; hence the study concludes the result inconsistent with the CAPM hypothesis. The value of λ_2 is -2.424.At 95% confidence level p–value accept the null hypothesis that means it is not significantly different from zero which is consistent with CAPM hypothesis. Hence, relationship is linear but the data is weak to explain the CAPM during this year.

4.2.5 Year (2015)

The year 2015 use same 29 sample company monthly data covering 2015 January to 2015 December and test is repeated with same test procedures used for other test period. In the beginning of test period the NEPSE index was recorded as 945.36 points and it was 1190.16 points at the end. The total gain in the index point was 244.8 points during this study period.

Table 4.14

Portfolio return and portfolio beta for the year (2015)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	-1.4313	-5.605 (0.000)*	0.224 (0.085)	0.042	3.057	0.085
P2	0.5871	-3.041 (0.009)*	0.531 (0.005)*	0.127	8.421	0.005*
P3	1.0661	-2.416 (0.063)	0.614 (0.004)*	0.112	8.799	0.004*
P4	0.4756	-2.543 (0.014)*	0.874 (0.000)*	0.290	28.632	0.000*
P5	2.6425	2.457 (0.019)	2.467 (0.000)*	0.762	224.252	0.000*

* *Shows significant at 95% confidence level.*

Table 4.14 shows that the beta of is increasing in order so is the case for the portfolio return except for portfolio P3. So, it validated the assumption higher the beta higher the return. In the case of portfolio 3 the value of R^2 is greater than 0.112, in the portfolio P4 it is 0.290 and in portfolio P5 it is 0.762, which shows that adequate correlation with market index. The intercept term value is insignificant for P3, P4 and P5 resulting acceptance of null hypothesis that alpha is not significantly different from zero at 95% of level of significance. Furthermore the estimated beta portfolios are found to be statically significant at 99% and 95% level of significance except portfolio P1. Therefore the study rejects the null hypothesis that the portfolio beta is not a significant determinant of portfolio return.

4.2.5.1 Estimation of security market line

From table 4.15 the valueλ_0 of intercept is (-1.164) statistically; the result shows that the p- value is higher than 0.05 accepting the null hypothesis at 95% confidence level. As, λ_0 is not significantly different from zero it is consistent with CAPM.

Table 4.15

Result of test of SML

	Coefficients	Standard error	t-value	p value
λ_0	-1.164	1.832	-0.636	0.570
λ_1	2.881	2.698	1.068	0.364

* *, ** shows significant at 95% and 90% confidence level.*

As per CAPM λ_1 should be equal to the average risk premium and here the p-value is higher than 0.05. It means λ_1 is significantly different from zero but should be greater than zero. But it is significantly different from zero at 90% confidence level. Hence it is concluded that the result is inconsistent with the CAPM and hence there is mixed result and the study have conclusive evidence in support of CAPM in this year.

4.2.5.2 Test of non –linearity

The result for the year 2015 is summarized below in the table 4.16. The result shows that the intercept (-1.217) of the model λ_0 is significantly different from zero. Statistically p-value reject null hypothesis at 5% level of significance. Thus it does not support CAPM.

Table 4.16

Result of test of non-linearity

	Coefficients	Standard error	t-value	p value
λ_0	-1.217	2.216	-0.549	0.638
λ_1	3.447	3.909	0.882	0.471
λ_2	-0.149	0.571	-0.261	0.819

* ** *shows significant at 90% confidence level.*

In the case of λ_1, p-value reject null hypothesis rejecting null hypothesis in favor of the CAPM hypothesis. As per the CAPM, the λ_1 should be equal to the average risk premium and hence the study concludes that the result is consistent with the CAPM hypothesis at 90% level of significance. In the case of λ_2, the value is (-0.149) and p-values shows it is insignificant at 5% level of significance. Which means it is consistent with CAPM. Hence the relationship is linear and the data is good to explain the CAPM during this year.

4.2.6 Year (2016)

This year considered the monthly data for the period from January 2016 to December 2016 of 29 sample companies.

Table 4.17

Portfolio return and portfolio beta for the sub period (2016)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	1.2880	-1.507	0.616	0.111	8.713	0.004*
		(0.244)	(0.004)*			
P2	1.0830	-1.359	0.739	0.108	8.462	0.005*
		(0.387)	(0.005)*			
P3	-0.4488	-1.959	1.061	0.292	23.874	0.000*
		(0.148)	(0.000)*			
P4	0.3830	-0.551	1.261	0.358	39.089	0.000*
		(0.658)	(0.000)*			
P5	-0.8194	-1.732	1.269	0.528	78.240	0.000*
		(0.053)	(0.000)*			

* *Shows Significant at 5%level.*

In the beginning of the year the NEPSE index was 1212 points and it was 1479.86 points at the end. The total gain in the index was 267.86 points during this period. During this sub period the market portfolio earns return of 0.2201.

The results shown in table 4.18 depicts that every portfolio except portfolio P3 and P5 earn more than market return. Here, portfolio P1 with lowest beta earn minimum return and portfolio P5 with highest beta earn maximum return. Similarly Portfolio P2 and P3 earn more return than return of the portfolio P4 despite of being lower beta. In the case of portfolio P1, P2 and P3, the R^2 value are 0.111, 0.108 and 0.292 respectively indicating less than adequate correlation with the market index. But for other portfolios, the R2 values are above 0.358 to 0.528, which indicates that above 35% and 52% of the variation in the script has been explained with the index. The value of constant term statically insignificant. Which implies that the alpha coefficient are not significantly different from zero and hence we can accept the null hypothesis that intercept is not significantly different from zero. All the P values of estimated

beta except for portfolio P1 and P2 are found to be statically significant at 99% level; thereby the study reject the null hypothesis that the portfolio beta is not a significant determinant of portfolio return.

4.2.6.1 Estimation of security market line.

The estimated result of the SML for the year 2016 is shown table 4.19. The table shows that the test shows the null hypothesis is rejected at confidence level. Which means λ_0 is significantly different from zero. Here the calculated value of intercept is (0.285) and is not significantly different from zero supporting the CAPM hypothesis at 95% confidence level. But CAPM hypothesis is rejected at 90% confidence level questioning the applicability in NEPSE.

Table 4.18

Result of test of SML

	Coefficients	Standard error	t-value	P value
λ_0	0.285	0.742	0.384	0.726
λ_1	0.013	0.603	0.021	0.985

** *shows statistically significant at 90% confidence level.*

Further from the table it is clear that λ_1 is 0.013 and the p-value is more than 0.05. Hence λ_1 is not significantly different from zero but it should be greater than zero as per CAPM. Thus the result is inconsistent with the CAPM hypothesis. Thus the applicability of CAPM is rejected in this year.

4.2.6.2 Test of non –linearity

Test for the non- linearity is used to check whether there exists no linearity between portfolio return with beta. As per theory, if CAPM holds true λ_0 and λ_2 will be equal to zero and λ_1 will be equal to average risk premium.

The results of the estimated values for the year 2016 are summarized in the table 4.19. The result shows that the intercept (0.517) of the model is not statistically different from zero as p-value is more than 0.05. So, null hypothesis is accepted and is consistent with the argument of CAPM at 95% confidence level.

Table 4.19

Result of test of non-linearity

	Coefficients	Standard error	t-value	P value
λ_0	0.517	1.139	0.453	0.695
λ_1	0.145	0.829	0.175	0.877
λ_2	-0.772	2.392	-0.323	0.777

The p-value for the λ_1, is 0.877 which is more than 0.05 leading towards acceptance of null hypothesis i.e. there is no price risk at NEPSE. As per the CAPM, the λ_1 should be equal to average risk premium; hence the study infer the result is inconsistent with the CAPM hypothesis. Moving towards value of λ_2 test accepts the null hypothesis which is consistent with CAPM hypothesis. Thus, the study can conclude that beta is linearly related with return. Hence the study cannot fully reject the application CAPM hypothesis in NEPSE during this year.

4.2.7 Year (2017)

The data used in the year consists of 29 sample company monthly data covering January 2017 to December 2017. In the beginning of the year the NEPSE index was 1477.72 points and it was 1431.1 points at the end. The total loss in market index 46.62 points for this study period. The return from the market portfolio was -0.0316 for this study period.

Results in the table 4.20 shows that the portfolio beta in increasing order the portfolio return is also increasing. The portfolio with lowest beta earns lowest return in this year. Further the value of R^2 is 0.244 for portfolio 1 as it has positive beta means it has any relation with market index. For the portfolio P2 and P3 the value of R^2 are between 0.31 and 0.35 indicating less than adequate correlation with market index. For portfolio P4 and P5 there is adequate correlation with market index as the value of R^2 are 0.469 and 0.679 respectively. The table shows that the value of constant are statistically insignificant so study cannot reject null hypothesis that alpha is not significantly different from zero. Positive constant value indicates that the portfolio have earned higher returns than CAPM has predicted and vice-versa. Most of the P-values of estimate beta are found to be statistically significant at 95% level of significance so thereby the study reject hull hypothesis that the portfolio beta is not a

significant determinant of portfolio return for P1, P2, P3, P4 and P5 for the same level of significance. Thus, the analysis gives a firm result in support of CAPM.

Table 4.20

Portfolio return and portfolio beta for the year (2017)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	-3.8677	-5.932 (0.000)*	0.638 (0.000)*	0.244	22.564	0.000*
P2	-3.5985	-5.241 (0.000)*	0.746 (0.000)*	0.318	32.598	0.000*
P3	0.3105	-0.994 (0.463)	0.832 (0.000)*	0.354	38.314	0.000*
P4	0.3292	1.082 (0.570)	1.355 (0.000)*	0.469	51.303	0.000*
P5	0.8070	3.736 (0.020)*	1.909 (0.000)*	0.679	148.131	0.000*

* *shows significant at 5%level*

4.2.7.1. Estimation of security market line

From Table 4.21, it is easily traceable that, the value of intercept term -1.545 is statistically not significantly different from zero as p-value is higher than 0.05. Thus result is consistent with CAPM as λ_0 is not significantly different from zero.

Table 4.21

Result of test of SML

	Coefficients	Standard error	t-value	P value
λ_0	-1.545	4.576	-0.338	0.758
λ_1	0.345	4.465	0.077	0.943

As per CAPM λ_1 should be equal to the average risk premium and here p-value concludes that λ_1 is not significantly different from zero at 95% level of significance which is inconsistent with CAPM hypothesis. Hence there is mixed result and the study don't have conclusive evidence in support of CAPM in the year 2017.

4.2.7.2 Test of non –linearity

While testing the non-linearity, as per CAPM the λ_0 and λ_2 will be zero and the λ_1 should be equal to the average risk premium. The result of the estimated values is summarized below in the table 4.22.

Table 4.22

Result of test of non-linearity

	Coefficients	Standard error	t-value	P value
λ_0	-3.832	3.778	-1.014	0.417
λ_1	3.899	4.016	0.971	0.434
λ_2	-0.813	0.468	-1.735	0.225

The result shows that the intercept of the model is greater than risk free rate and the constant λ_0 seems to be significantly different from zero. Statistically p-value shows that λ_0 is significantly different zero at 5% significant level and there by the null hypothesis accepted. Hence it is consistent with CAPM. The p-value for the λ_1 shows NEPSE does not have price rise as λ_1 is not significantly different from zero. As per CAPM, λ_1 should be equal to the average risk premium; hence the study can conclude that result is inconsistent with CAPM hypothesis. The p-value of λ_2 (0.225) is more than 0.05 and hence the value is significantly different from zero, which is inconsistent with CAPM hypothesis. Thus the CAPM hypothesis could not clearly be rejected at NEPSE during the year.

4.2.8 Year (2018)

Like as other year this year also cover 1 year's monthly data of 29 sample companies. It is noted NEPSE index as 1413.71 point in January of 2018 and it was 1178.03 points at December of 2018. The total loss in this study period was 235.68 points. The return from investment in market portfolio was -0.1667.

Table 4.24 shows the portfolio beta in ascending order but that is not a case for portfolio return. The value of R^2 of first three portfolio namely P1, P2, and P3 (0.176, 0.199 and 0.088) respectively indicates less than adequate correlation between the market return and portfolio return.

Table 4.23

Portfolio return and portfolio beta for the year (2018)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	-2.8742	-4.696 (0.000)*	0.465 (0.000)*	0.176	14.977	0.000*
P2	-1.4250	-1.014 (0.473)	0.842 (0.000)*	0.199	17.381	0.000*
P3	-1.6254	-0.020 (0.995)	1.044 (0.021)*	0.088	5.631	0.021*
P4	-2.3505	-0.265 (0.852)	1.125 (0.000)*	0.304	30.628	0.000*
P5	-4.1053	1.334 (0.643)	1.691 (0.000)*	0.194	16.842	0.000*

* *Shows significant at 5%level.*

But the value of R2 as 0.304 and 0.194 for P4 and P5 shows low correlation with market index indicating 30% to 19% of variation in the scrip has been explained by the relationship with the index. Above table shows that the constant are statistically insignificant at 95% level of significance and thereby the study cannot reject null hypothesis that alpha is not significantly different from zero. All the p-values of estimated betas are found to statically significant at 95% level; hence study reject the null hypothesis that the portfolio beta is not significant determinant of the portfolio return.

4.2.8.1 Estimation of security market line

The estimated result of the SML for the year 2018 is shown in the table 4.24 below. Here the calculated value of the intercept is -1.215 and it is significantly different from zero. Statistically, the result of p-value shows that intercept term is significantly different from zero at 95% confidence level. This is inconsistent with CAPM hypothesis. Further from table it is clear that λ_1 is -1.150 and p-value is higher than 0.05. Hence, λ_1 is significantly different from zero. As per CAPM the λ_1 should be greater than zero, there by result is inconsistent with CAPM hypothesis. Thus CAPM is rejected in this year.

Table 4.24

Result of test of SML

	Coefficients	Standard error	t-value	P value
λ_0	-1.215	1.154	-1.053	0.370
λ_1	-1.150	0.966	-1.191	0.319

4.2.8.2 Test of non –linearity

The results of the estimated values for the test of non-linearity are summarized in the table 4.25. The result shows that the intercept of -0.777 of the model is λ_0 is significantly different from zero. Statistically the p-value of 0.579 concludes that the null hypothesis is accepted at 5% level of significance. It is consistent with CAPM hypothesis that portfolio that is uncorrelated with the market earn risk free return. In the case of λ_1, p-value is more than 0.05, which means it is significantly different from zero. As per the CAPM, the λ_1 is -0.439; hence the study concludes incontinent with CAPM hypothesis.

Table 4.25

Result of test of non-linearity

	Coefficients	Standard error	t-value	P value
λ_0	-0.777	1.183	-0.657	0.579
λ_1	-0.439	1.134	-0.387	0.736
λ_2	-1.160	1.051	-1.103	0.385

The value λ_2 is -1.160 and p-value of 0.385 suggests that it is statistically significantly different from zero at 5% significance level. Hence, the study concludes that it is consistent with the CAPM hypothesis. Hence the relationship is linear but the data is weak to explain the CAPM during the year.

4.2.9 Year (2019)

This year considered the monthly data for the period from January 2019 to December 2019 of 29 sample companies

Table 4.26

Portfolio return and portfolio beta for the sub period (2019)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	-1.2465	-4.902 (0.001)*	0.199 (0.332)	0.016	0.957	0.332
P2	-1.0963	-3.357 (0.001)*	0.502 (0.000)*	0.166	13.885	0.000*
P3	-0.6132	-2.466 (0.060)	0.590 (0.002)*	0.127	10.191	0.002*
P4	-1.1406	-2.913 (0.001)*	0.608 (0.000)*	0.286	28.018	0.000*
P5	-3.5791	-5.133 (0.001)*	0.655 (0.004)*	0.113	8.936	0.004

* *Shows significant at 5%level.*

In the beginning of the year the NEPSE index was 1195.536 points and it was 1263.384 points at the end. The total gain in the index was 67.848 points during this period. During this year the market portfolio earns return of 0.0568.

The results shown in table 4.26 depicts that every portfolio has less return than market return. The value of R2 of first three portfolio namely P1, P2, and P3 (0.016, 0.166 and 0.127) respectively indicates less than adequate correlation between the market return and portfolio return. The value of R2 as 0.286 and 0.113 for P4 and P5 shows low correlation with market indicating 11% to 28% of variation in the scrip has been explained by the relationship with the index. Above table shows that the constant are statistically insignificant at 95% level of significance and there by the study cannot reject null hypothesis that alpha is not significantly different from zero. All the p values of estimated betas expect portfolio 1 are found to statically significant at 95% level; hence study reject the null hypothesis that the portfolio beta is not significant determinant of the portfolio return.

4.2.9.1 Estimation of security market line

The estimated result of the SML for the year 2019 is shown in the table 4.27 below. Here the calculated value of the intercept is 0.660 and it is significantly different from

zero. Statistically, the result of p value shows that intercept term is significantly different from zero at 95% confidence level. This is consistent with CAPM hypothesis.

Further from table it is clear that λ1 is -2.125 and p value is higher than 0.05. Hence, λ1 is significantly different from zero. As per CAPM the λ1 should be greater than zero, there by result is inconsistent with CAPM hypothesis. Thus CAPM is rejected in this year.

Table 4.27

Result of test of SML

	Coefficients	Standard error	t-value	P value
λ_0	0.660	0.970	0.680	0.545
λ_1	-2.125	0.875	-2.427	0.094

** *Shows statistically significant at 90% confidence level.*

4.2.9.2 Test of non –linearity

The results of the estimated values for the test of non-linearity are summarized in the table 4.28. The result shows that the intercept -0.122 of the model is λ_0 is significantly different from zero. Statistically the p value of 0.903 concludes that the null hypothesis is accepted at 5% level of significance. It is consistent with CAPM hypothesis that portfolio that is uncorrelated with the market earn risk free return. In the case of λ_1, p value is more than 0.05, which means it is not significantly different from zero. As per the CAPM, the λ_1 should be equal to the average risk premium; hence the study conclude inconsistent with CAPM hypothesis.

Table 4.28

Result of test of non-linearity

	Coefficients	Standard error	t-value	P value
λ_0	-0.122	0.884	-0.138	0.903
λ_1	-0.436	1.201	-0.363	0.752
λ_2	-0.675	0.395	-1.710	0.229

** *Shows statistically significant at 90% confidence level.*

The value λ_2 is -0.675 and p value 0.229 suggest that it is statistically significantly

different from zero at 5% significance level. Hence, the study concludes that it is consistent with the CAPM hypothesis. Hence the relationship is linear but the data is weak to explain during the year.

4.2.10 Whole study period (2011- 2019)

This study also make analysis of long time period covering 9 year monthly data of 29 sample companies from January 2011 to December 2019. In the beginning of this year the NEPSE index was points 403.12 and it was 1263.384 points at the end resulting the total gain of points is 860.264. The return from the investment in market portfolio i.e. market index was 2.1340.

From the table 4.26, it is easily traceable that beta of the portfolio is in increasing order but there is fluctuation in the portfolio return. Each portfolio is earning the higher return than the market return of 2.1340.

Table 4.29

Portfolio return and portfolio beta for the sub period (2011-2019)

Portfolio	Portfolio Return (rp)	Constant	Beta	R^2	F-value	Sign.
P1	0.7940	-1.832 (0.000)*	0.557 (0.000)*	0.137	102.921	0.000*
P2	0.9438	-1.326 (0.023)*	0.659 (0.000)*	0.123	75.342	0.000*
P3	1.9666	1.297 (0.407)	1.116 (0.000)*	0.044	29.884	0.000*
P4	1.4577	0.861 (0.149)	1.137 (0.000)*	0.248	212.949	0.000*
P5	0.1865	-0.317 (0.403)	1.164 (0.000)*	0.461	553.511	0.000*

* *Shows significant at 5%level.*

Here, higher the beta higher return is violated as the portfolio with lower beta earns more than portfolio with highest beta. The value of R^2 for portfolio P1 and P2 shows the less than adequate correlation between portfolios returns and market index. But for the portfolio P3, P4 and P5, the values of R^2 are 0.044, 0.248 and 0.461 respectively indicating also low correlation with market index i.e .4% to 46% of the

variation in the scrip has been explained by the relationship with the index. The table shows that the constants are statistically insignificant and hence the study cannot reject null hypothesis i.e. the intercept term is not significantly different from zero. Further the estimated betas of the portfolios are found to be statically significant at 95% level; thereby this study rejects the null hypothesis that the portfolio beta is not a significant determinant of portfolio return.

4.2.10.1 Estimation of security market line

The estimated result of the 9 period which cover whole study period is shown in the table 4.30 below. The table shows that the test accept the null hypothesis that λ_0 is significantly different from zero. Here, value of the intercept is 0.662 of the model is λ_0 is significantly different from zero. Statistically, the p-value is 0.652, which is high than 0.10. So, at 10% level of significance and there by the study accept the null hypothesis. But at 5% level of significance it is continent with CAPM hypothesis for the whole 9 years study period. This means the portfolio uncorrelated with market will get return equivalent to risk free rate in NEPSE.

Table 4.30

Result of test of SML

	Coefficients	Standard error	t-value	P value
λ_0	0.662	1.325	0.499	0.652
λ_1	0.447	1.402	0.319	0.771

*** shows statistically significant at 90% confidence level.*

Further from the table it is clear that λ_1 is (0.447) and p-value clearly indicates λ_1 is statistically not significantly different from zero at 5 % level of significance. But as per CAPM theory λ_1 should be equal to average risk premium and should be greater than zero. Hence it is concluded that the result is inconsistent with CAPM. As there is mixed result so there is no any conclusive evidence in support of CAPM.

4.2.10.2 Test of non –linearity

Test for the non-linearity is used to check whether there exists non-linearity between portfolio return and beta. As per the theory of CAPM, if it hold true then λ_0 and λ_2 will be equal to zero and λ_1 will be equal to average risk premium i.e. greater than zero.

Table 4.31

Result of test of non-linearity

	Coefficients	Standard error	t-value	P value
λ_0	-7.602	9.869	-0.770	0.522
λ_1	21.505	24.939	0.862	0.479
λ_2	-12.268	14.504	-0.846	0.487

*** shows statistically significant at 90% confidence level.*

The results of the estimated values for the period 2011-2019 are summarized in table 4.31 above. The result shows that the intercept (-7.602) of the model is significantly different from zero. But statistically it is different than zero at 5% significance level leading to rejected of null hypothesis and is consistent with the argument of the CAPM. But it is statistically different from zero at 10% level of significance giving contradict evidence against CAPM hypothesis. In the case of λ_1, the p-value accepts the null hypothesis at there is no price risk at NEPSE. Here, λ_1 is not statistically different from zero. As per CAPM, the λ_1 should be equal to the average risk premium; hence the result is inconsistent with the CAPM hypothesis.

Again, the value of the λ_2 is (-12.268) and p-value accept the null hypothesis at 95% confidence level that means it is not significantly different from zero. Hence, the result is inconsistent with CAPM hypothesis. Hence, the relationship is linear but the data is weak to explain the CAPM during the study period.

4.3 Testing consumption CAPM

In this section, the study discusses the empirical finding of the Consumption CAPM and also compares the conventional CAPM in explaining constructed equity portfolio returns. Before explaining the main analysis in this study the study first discusses the trends, descriptive statistics. The results obtained are presented and analyzed as follows;

4.3.1 Descriptive statistics

Figure 3 is line graph presenting the performance of the constructed portfolio returns. The graphs fluctuation in the portfolio returns of the sample company.

Figure 3 *Line graph of portfolio returns*

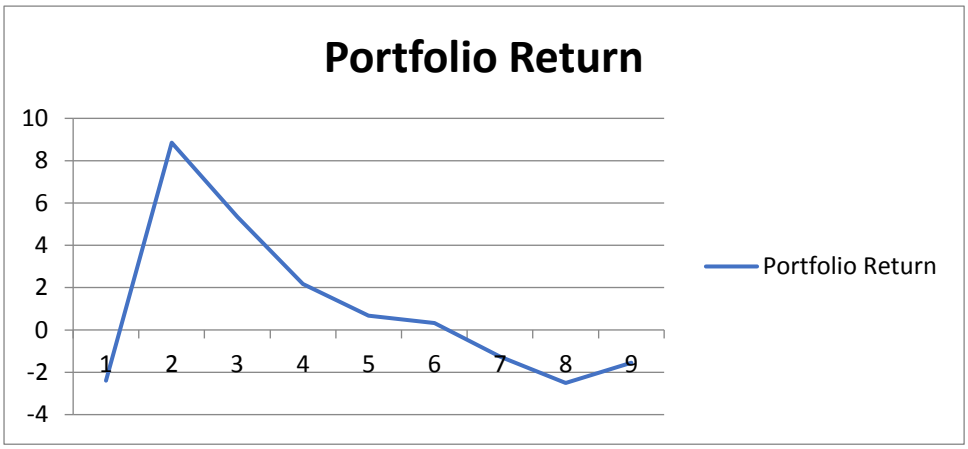


Table 4.32 shows the descriptive statistics for the variables portfolio returns, excess portfolio returns, and market premium. The average return on the portfolio return is positive and greater than market risk premium. All the variables are positively skewed while kurtosis shows that the variables are playtokutic as the value is less than 3. Here for our analysis the dependent variable is excess portfolio return. The z- value (Skewness/SE and Kurtosis/SE) for skewness and kurtosis are 0.5137 and 0.2076 .Which lies between 1.96 and -1.96 so the dependent variable is normally distribution.

Table 4.32

Descriptive statistics for the variables portfolio returns, excess portfolio returns and market premium

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Portfolio return	9	1.0741	3.8366	1.227	0.717	0.839	1.400
Excess Portfolio return	9	-3.4989	3.8366	1.277	0.717	0.839	1.400
Market premium	9	-3.4964	1.8121	0.052	0.717	-0.695	1.400

4.4 Findings of the study

This section illustrates the main findings of the study that is derived from above analysis of secondary data of CAPM model.

i. The individual company's beta range between -0.026 to 1.790, -0.019 to 2.494, -0.154 to 2.992, -0.029 to 1.307, -0.013 to 3.049, 0.000 to 2.226, -0.009 to 3.982, -0.135 to 3.877 in the different year. The companies like Nepal Bangladesh bank limited, Bank of Kathmandu Ltd, Laxmi Bank Limited, Kumari Bank Limited, Soaltee Hotel Limited, Taragon Regency Hotel Limited, Oriental Hotel Limited, National Life Insurance Co. Ltd., Nepal Life Insurance Co. Ltd., Life Insurance Co. Nepal, Citizen Investment Trust, United Finance Ltd., Shree Investment Finance Co. Ltd., Janaki Finance Ltd. have negative beta during different year. Whereas the company like Nabil Bank Limited, Siddhartha Bank Limited, Kumari Bank Limited, Nepal SBI Bank Limited, Standard Chartered Bank Limited, Surya Life Insurance Company Limited, Prime Life Insurance Company Limited, Oriental Hotels Limited highest beta in different year.

ii. During the analysis of the whole study period. The study found that the beta range for the individual stock -0.124 to 1.489 in which the company with the lowest beta is Bisal Bazar Company Limited and with highest beta is Sidhartha Bank Limited.

iii. During the year 2011 the each portfolio earns negative returns. The intercept term in the first sub period is not significantly different from the zero except in the first portfolio at 5% significance level. This sub period find that beta is not a significant factor for the determination of portfolio return in the case of portfolio with lower beta(P1, P2 and P3) but significant factor for the estimation in the case of portfolio with higher beta(P4 andP5).

iv. For the SML test in year 2011 λ_0 is not significantly different from zero which in favor of CAPM hypothesis. But value of λ_1 statistically equal to zero in inconsistent with the CAPM showing negative price risk in the market. The value of λ_2 is 1.302 but not statistically different from zero providing the evidence that beta are linearly related in this year.

v. During the year 2012 of analysis the study finds same result that each portfolio is enjoying higher return than market. And beta is not a significant determinant of portfolio return for the portfolio with lower beta but significant factor for the estimation in the case of portfolio with higher beta. The value of λ_1 is 5.583which

is statistically not different from zero which means there is positive price risk from market return. Similarly, the value of λ_2 is 8.577 statically not different from zero give the evidence that the beta and return are linearly related.

vi. In the year 2013 market portfolio is gaining of 0.4837 and every portfolio has positive beta as it has positive correlation with the market. This result contradict the CAPM assumption of higher the risk higher return. In this sub period variation in each portfolio except portfolio P1 has less than adequate correlation with market as R^2 lies from 4% to 61%. SML testing found λ_0 statically different from zero concluding that assets portfolio whose returns are uncorrelated with the market returns doesn't have expected return equal to risk-free interest rate. The test of Non linearity found that the values of λ_0, λ_1 and λ_2 are significantly different from zero which provided the clear evidence in favor of the CAPM hypothesis.

vii. In the Year 2014 each portfolio is gaining except P4 like as the market. The value of the constants except portfolio P1 are statistically significant and negative. It indicates that alpha coefficient are significantly different from zero which study reject the null hypothesis that the intercept term is not significantly different from zero and also indicates that portfolio has lower returns than CAPM predicted. The test of SML gives inconsistent result as λ_0 value is 1.857 statistically different from zero and λ_1 value is statistically not different from zero concluding that portfolio has positive price risk with the market.

viii. In the year 2015 each portfolio is earning higher return except P1 than market. Except portfolio P1 each portfolio is accepting the CAPM assumption that beta is significant factor to determine portfolio return at both 95% and 99% level of significance. Like as in sub period four the SML test doesn't provide the consistent result with CAPM hypothesis, as intercept term is statistically different from zero and λ_1 is not different from zero showing negative price risk. Test of non-linearity shows weak linear relation as λ_2 is not significantly different from zero but intercept term is statically equal to zero.

ix. In the case of year 2016 the test of SML rejects the CAPM as λ_1 is statically equal to zero showing negative price risk with market. The test of Non linearity shows the mixed result i.e .λ_0 and λ_2 are statically not different from zero. Which are in favor of CAPM. But λ_1 also being statically not different from zero doesn't allow to fully accept or fully reject CAPM hypothesis. Similar kinds of result are

obtained in this year.

x. In the case of year 2017 each portfolio is gaining except P1 and P2 like as the market. The value of the constants except portfolio P1 are statistically significant and negative. It indicates that alpha coefficient are significantly different from zero which study reject the null hypothesis that the intercept term is not significantly different from zero and also indicates that portfolio has lower returns than CAPM predicted. The test of SML gives inconsistent result as λ_0 value is -1.545 statistically different from zero and λ_1 value is statistically not different from zero concluding that portfolio has positive price risk with the market.

xi. In year 2018 total gain in the index was 67.848 points during this year. During the year 2018 of analysis the study finds same result that each portfolio is lower return than market. And beta is not a significant determinant of portfolio return for the portfolio with lower beta but significant factor for the estimation in the case of portfolio with higher beta. The value of λ_1 is -1.150 which is statistically not different from zero which means there is positive price risk from market return. Similarly, the value of λ_2 is -1.160 statically not different from zero give the evidence that the beta and return are linearly related.

xii. In the case of year 2019 all the portfolio return is negative which means negative correlated with market. During this year 2019 the test of SML reject the CAPM as λ_1 is statically equal to zero showing negative price risk with market. The test of Non linearity shows the mixed result i.e .λ_0 and λ_2 are statically not different from zero. Which are in favor of CAPM. But λ_1 also being statically not different from zero doesn't allow to fully accept or fully reject CAPM hypothesis. Similar kind of result is obtained in this year.

xiii. In year 2011-2019 covering whole study year finds that each portfolio earns more returns than the market returns but higher beta higher returns is violated even in long period as portfolio 1 with lowest beta earn more return than portfolio 5 with highest beta. It also finds that beta is significant determinant of return of the portfolio at 95% confidence level. SML test found statically zero intercept term which is consistent with CAPM due to this even though $\lambda 1$ is statically not different from zero the CAPM hypothesis cannot be fully rejected. The test of Non linearity finds that weak linear relationship between risk and return.

xiv. The test of CAPM finds that average return on the portfolio is positive and greater

than the market risk premium. (1.0741>-3.4964). The z- value (Skewness/SE and Kurtosis/SE) for skewness and kurtosis are 0.5137 and 0.2076. This lies between 1.96 and -1.96 so the dependent variable is normally distribution.

CHAPTER V

CONCLUSION

This chapter provides the discussions drawn from the tests carried out in the study and conclusions of the findings. The last part of this chapter provides the implications of the study carried out to future researcher, professor, investors, portfolio managers and scholars.

5.1 Discussions

The study tested the applicability of CAPM in NEPSE. The study has used monthly stock prices of 29 sampled company listed on the NEPSE from 2011 January to 2019 December. The study found negative beta value in some of the stock and portfolio which mean their return that moves in the opposite direction from the stock market. When the market rises, then a negative-beta stock/portfolio generally falls. When the market falls, then the negative-beta investment will tend to rise. This is generally true of gold stocks and gold bullion. Because gold is seen as a more secure store of value than currency, a market crash prompts investors to sell their stocks and either move into cash (for zero beta) or buy gold (for negative beta) but some of the stock and portfolio are showing such character in the different sub study period.

Initially study found that higher risk higher return assumption of the CAPM has been violated which is similar to earlier studies findings. Choudhary and Choudhary (2010) tested the validity of CAPM in India equity market also found that higher risk (beta) is not associated with a higher level of return and this result don't support the CAPM theory. But these results contradict with the result of study made on shorter period CAPM validity analysis by Lazar and Yaseer (2011), on Indian market. They found that generally higher beta provides higher return to the investors in most of the case beta explained the variation in portfolio returns.

This study also found that portfolio with higher beta and lower beta has positive and negative constant values respectively, which suggest that the portfolio with higher beta has bagged more return than CAPM predicted and portfolio with lower beta has bagged less return than CAPM predicted. But in the study made on shorter period CAPM validity analysis by Lazar and Yaseer (2011), on Indian market found

portfolio in the Indian market has bagged more than return that CAPM has predicted. Similarly, in the analysis of risk-return relationship only for the portfolio with higher beta (i.e. P4 and P5) has R^2 value higher than .60, which shows that for the portfolio with higher beta above 60% of variation, has been explained by relationship with the index.

In the CAPM testing with SML, the null hypothesis of λ_1 must be rejected to be in favor of CAPM hypothesis i.e. there is positive price risk in capital market. But in each of the sub period the null hypothesis is accepted giving inconsistent result in favor of CAPM. Yasmeen and etall (2012) test null hypothesis of $\gamma 1=0$, against the alternative hypothesis that $\gamma 1>0$. And found the same result at the 10% level of significance they accept the null hypothesis $\gamma 1=0$, which how that there is not a positive relation between the market risk and the excess returns. Again at the 5% and 1%, the same conclusions hold which are against the CAPM prediction that there is a positive price of risk in the Pakistani capital markets. This result is also in line with studies results of (Yang and Donghui, 2006; Loukeris, 2009; Choudhary and Choudhary, 2010; Bilgin and Basti, 2011).

In the test of non-linearity, as per CAPM λ_0, λ_2 must be statistically equal to zero. And λ_1 must be statically different from the zero. But concerning the coefficient λ_2, the results show that coefficient λ_2 is not significantly different from zero except in his year, which means that these results are consistent with the CAPM hypothesis and betas are linearly related with rate of return. This result is in line with studies results of (Black *et. al.,* 1972; Fama and MacBeth, 1973; Yang and Donghui, 2006; Choudhary and Choudhary, 2010). On the other hand, results of other studies contradicted our results (Fama and French, 1992; Bilgin and Basti, 2011), thus, CAPM can be accepted in the year 2015, but still the results show weakness to fully explain the model. For the must of sub period as well as long period except the year 2014 the Non linearity support CAPM but doesn't give conclusive evidence in favor of CAPM which is similar with study finding made by Lazar and Yaseer (2011), But year 2014 does not favor the Non linearity test. And in this period market is bearing loss and most of the portfolio acting same way except the portfolio P1 with lowest beta.

5.2 Conclusion

CAPM is considered to be an elegant theory with significant implications to the valuation of the assets and the investors' behavior. The use of this model is constantly questioned on the grounds of the hypotheses of an ideal world which strengthen it. Short period analysis of CAPM test gives mixed result, in some year the test clearly rejects CAPM hypothesis where as in other year it is partially supported. The CAPM hypothesis higher risk higher return has been violated in each year. The analysis shows that most on lower beta portfolio has negative intercept term and higher risk beta has positive intercept term indicating portfolios has bagged lower return and higher return than CAPM has predicted. The study has shown two nature of character regarding intercept term for the lower beta portfolio it is significantly different from zero rejecting the null hypothesis which against then CAPM theory. And for the portfolio with higher beta intercept term is significantly not different from zero which is consistent with CAPM theory about intercept term. Hence, the study makes a conclusion that for the portfolio with higher beta has expected return equal to risk-free interest rate. This is contradicting with lower beta portfolio. Regarding the security market line, The CAPM predicts that $\lambda 0$ (the intercept) should be equal to zero and the $\lambda 1$ (the slope of SML) should be equal to the average risk premium. The result for the different sub periods by using portfolios with 6 securities mostly rejected CAPM. Seven out of ten test results clearly reject the CAPM hypothesis while three partially support CAPM hypothesis. From the above result, we cannot give conclusive evidence in favor of CAPM.

The test for non- linearity between beta and stock return is tested by including beta square coefficient. As per CAPM the portfolio return and its betas are linearly related with each other when the $\lambda 0$ and $\lambda 2$ is equal to zero. The test for the non- linearity tells that, for the whole and adjusted period the result is in support of the CAPM hypothesis. For the adjusted period we cannot give conclusive evidence in support of the CAPM hypothesis, but the model supports the non-linearity of the CAPM factors in most of the cases, which explains the beta estimates. Further the high value of the estimated correlation coefficient between the intercept and the slope indicates that the model explains excess returns. However in most of the case, the intercept have value near to zero, weakens above explanation.

The long run analysis of CAPM does not favor CAPM assumption higher beta higher return as portfolio with lower beta earn more return than that of higher beta. But long run analysis accepts that beta is a significant factor to define risk and return relationship at 95% confidence level. The test of SML and non-linearity in long horizon give similar result as short horizon. It supports CAPM but do not give conclusive evidence in favor of CAPM.

In short as the both short range and long range analysis of the CAPM doesn't give conclusive evidence in favor or against the CAPM so this study also doesn't find conclusive evidence in favor or against the applicability of CAPM to wrap up the question of the applicability of the CAPM in Nepal Stock Exchange. Hence, it can be concluded that the systematic risk alone cannot predict the return on the portfolio. In addition, this study can conclude that excess return in portfolio is explained by systematic risk but cannot conclude which, either CAPM in superior assets valuation model.

5.3 Implications

The studies apply the capital assets pricing model and consumption assets pricing model in Nepalese Stock Market. The finding of the study has implication investor, policymaker and future researcher. The study found mixed result in applicability of capital assets pricing model and also unable to give evidence that to capital assets pricing model. Investor a real ways in search of perfect tool for the valuation of assets because they want to get fruitful return from their investment. From the study the investor will know the fact that CAPM are not appropriate tool for asset valuation through risk and return relationship. So investor, portfolio manager, financial consultancies should try to use another model maybe a multi-factor model in order to understand the risk-return relation of the securities with the market index.

The policy makers need to focus on the assets valuation techniques to be used for the valuation of the asset. There are various tools such as extended versions of CAPM, Multi factor model which may be applicable in the Nepal Stock Exchange. Policy maker should ensure the appropriate tool of evaluating the assets so that it will not result negative impact on the financial environment of the county.

As research is ongoing process and existing literature always support future researcher to find the research gap. To ensure that follow up investigations are more

rigorous and to offer other avenues for future exploration, the future researcher should incorporate fact like as use of more than 30 years of observations to test the CAPM, consider the impact of the variables; EPS, P/E, MV/BV, Dividend Yield of stock, Company Size and other financial and marketing indicators, thus many studies proved that these variables have significant impact on stock return along with market risk and per capital consumption. Similarly, future researcher should consider the effect of stock dividend and cash dividend not only the capital gain while calculating return on the share and should test the CAPM.

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