RISK AND RETURN ANALYSIS OF COMMERCIAL BANK IN NEPAL

A Dissertation Submitted to the Office of the Dean, Faculty of Management in Partial Fulfillment of the Requirements for the Master's Degree

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CERTIFICATE OF AUTHORSHIP

I hereby corroborate that I have researched and submitted the final draft of dissertation entitled RISK AND RETURN ANALYSIS OF COMMERCIAL BANK IN NEPAL. The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees nor has it been proposed and presented as part of requirements for any other academic purposes. The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the dissertation.

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June, 2025

REPORT OF RESEARCH COMMITTEE

Mr. Krishna Prasad Paudel has defended research proposal entitled RISK AND RETURN ANALYSIS OF COMMERCIAL BANK IN NEPAL **s**uccessfully. The research committee has registered the dissertation for further progress. It is recommended to carry out the work as per suggestion and guidelines of supervisor Dhurba Subedi and submit the dissertation for evaluation and Viva-Voce examination.

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APPROVAL SHEET

We, the undersigned, the dissertation entitled RISK AND RETURN ANALYSIS OF COMMERCIAL BANK IN NEPAL presented by Krishna Prasad Paudel for the degree of Master of Business Studies (MBS Semester) and conducted the viva voce examination of the candidate. We hereby certify that the acceptable for the award of degree.

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ABBREVIATIONS

CAPM	:	Capital Assets Pricing Model
CS	:	Common Stock
CV	:	Coefficient of Variation
DF	:	Degree of Freedom
DPS	:	Dividend per Share
EMH	:	Efficient Market Hypothesis
EPS	:	Earnings per Share
FY	:	Fiscal Year
HBL	:	Himalayan Bank Limited
HPR	:	Holding Period Return
JV	:	Joint Venture
MBL	:	Machhaouchhare Bank Limited
MPS	:	Market Price of Share
NEPSE	:	Nepal Stock Exchange
NRB	:	Nepal Rastra Bank
SCB	:	Stander Charter Bank Limited
SD	:	Standard Deviation
SML	:	Security Market Line
SR	:	Systematic Risk
SS	:	Sum of Squares
SSE	:	Residual Sum of Square
SSR	:	Regression Sum of Square
SST	:	Total Sum of Square
TU	:	Tribhuvan University
USR	:	Unsystematic Risk

ABSTRACTS

This research investigates the risk and return characteristics of selected Nepalese commercial banks listed on the Nepal Stock Exchange (NEPSE). It explores the current status of risk and return, the correlation between the two, and how risk influences return for three banks: Machhapuchchhre Bank Limited (MBL), Himalayan Bank Limited (HBL), and Standard Chartered Bank Nepal Limited (SCBNL). Secondary data were gathered from bank reports, NEPSE records, and financial statements. The analysis utilized various financial and statistical measures such as standard deviation, beta coefficient, and coefficient of variation. The results illustrate the risk-return profiles of these banks, providing valuable insights to investors for making well-informed investment choices and highlighting the critical role of risk management in maximizing returns.

Keywords: Risk, Return, Commercial Banks, Nepal Stock Exchange, Systematic Risk, Beta Coefficient, Investment.

CHAPTER-I
INTRODUCTION

1.1 Background of the Study

Risk refers to the likelihood of encountering danger, harm, or loss. In the context of investments, risk implies the possibility of an unexpected and unfavorable outcome that can negatively impact a business. Investment risk specifically relates to the chance that actual returns will fall short of the expected returns. Uncertainty remains a significant risk factor for investors participating in the stock market. Stocks inherently embody this uncertainty because the realized returns may be lower than anticipated. One primary cause of this uncertainty is the fluctuation in the price at which a stock can be sold, which can also reduce the amount of earnings reinvested by the company, thereby constraining its growth potential (Robert & Nardin, 2016).

The risk associated with a stock can be assessed by observing its price volatility. Different types of securities, such as treasury bills, long-term government bonds, corporate bonds, and common stocks, carry varying levels of risk. This study focuses on common stocks. Common stock represents a corporation's commitment to distribute dividends as deemed appropriate by its board of directors. Common stocks are considered relatively risky investments because their holders are the company's ultimate owners and expect higher returns. However, there is no guarantee that these anticipated returns will materialize, making uncertainty a critical risk factor for stock market investors (Pandeya & Shrestha, 2024).

Businesses face various risks stemming from both internal and external sources, broadly categorized as business risk and financial risk. Business risk arises from uncertainties related to future market demand or costs of inputs, whereas financial risk involves fluctuations in market interest rates, exchange rates, stock prices, and commodity prices (Kandel, 2024).

Return is the primary objective of any investment, with an inherent acceptance of some level of risk. The field of finance primarily addresses monetary risk and return, which greatly influence decisions from individuals to large corporations. Return refers to the income generated from an investment. Investors commit their resources with the expectation of earning returns as compensation for giving up liquidity. Consequently, investors seek investment opportunities that promise higher returns and

prefer those with more favorable yield prospects. The banking sector plays a vital and dynamic role in the economy by mobilizing idle funds and channeling them to sectors in need. It serves as the cornerstone of trade, commerce, and industry (Jack, 2014).

Within the Nepalese context, commercial banks generally perform well compared to other public limited companies. However, joint venture banks with foreign partnerships tend to outperform purely Nepalese banks due to superior management efficiency and risk management capabilities. Specifically, Nepalese banks face a higher level of internal (firm-specific) risk (Hussain & Jafar, 2020).

The banking system in Nepal was established with the founding of Nepal Bank Limited in 1937. Later, in 1955, Nepal Rastra Bank was created as the first central bank to supervise, regulate, and guide commercial banking activities. Subsequently, Rastriya Banijya Bank, a government-owned commercial bank, was established in 1966 to further develop banking services in the country.

1.2 Problem Statement

The current status of risk and return among Nepalese commercial banks reveals a varied financial environment, where different banks show differing levels of profitability and risk exposure. For instance, Machhapuchchhre Bank Limited (MBL) tends to offer higher expected returns but also experiences greater volatility, whereas Standard Chartered Bank Nepal Limited (SCBNL) typically records lower returns accompanied by reduced risk. Understanding this landscape is crucial for investors, as evaluating both potential rewards and associated risks is necessary for making informed investment choices. Previous research has often relied on outdated data and limited risk evaluation methods, highlighting the need for updated and comprehensive studies that reflect recent shifts in market conditions and banking practices (Kandel, 2024).

Examining the relationship between risk and return within Nepal's banking sector is vital to determine if the principle that higher risk should be rewarded with higher returns holds true locally. Earlier studies have frequently concentrated on isolated measures of risk, often neglecting to differentiate between systematic risk (market-wide factors) and unsystematic risk (bank-specific factors), as well as their distinct effects on returns. This oversight leaves ambiguity regarding how these risks influence returns in Nepalese banks (Pandey & Shrestha, 2024). A clearer

understanding of this relationship will assist investors and policymakers in grasping market behavior better, thus supporting more effective portfolio management and risk control strategies tailored to the unique dynamics of Nepal's banking industry (Hussain & Jafar, 2020).

Assessing how risk impacts returns remains a critical issue, particularly given the evolving economic conditions and regulatory landscape affecting Nepalese commercial banks. Although both systematic and unsystematic risks play roles in influencing returns, recent studies have not sufficiently quantified their respective effects. Gaining insight into these impacts is essential for accurately evaluating banks' risk-adjusted performance and for guiding investment decisions (Gautam, 2014). Addressing this requires employing advanced statistical methods alongside up-to-date data to better understand how different types of risk translate into financial results in Nepalese commercial banks (Shakya, 2015).

Commercial banks tend to accumulate large deposits, yet the availability of investment opportunities is relatively limited. This imbalance can lead to a highly liquid market, which may adversely affect the country's overall economic condition. In a competitive financial environment, banks often appear willing to extend loans, advances, and other credit facilities even when clients' deposits are insufficient. When funds are invested without thorough consideration of financial and business risks, banks risk earning lower returns or even suffering losses on their principal (Khadka, 2016).

The primary research problem addressed in this study is the analysis of risk and return in commercial banks. Additional research questions include the following:

- How do Nepalese commercial banks currently stand in terms of risk and return?
- Does a relationship exist between risk and return among Nepalese commercial banks?
- To what extent does risk affect the returns of Nepalese commercial banks?

1.3 Objectives of the Study

The primary objective of this study is to evaluate the risk and return of selected commercial banks. The specific objectives include:

- To assessing the present status of risk and return in Nepalese commercial banks.

- To investigating the relationship between risk and return within Nepalese commercial banks.
- To examining how risk influences the returns of Nepalese commercial banks.

1.4 Rationale of the Study

This study has proven valuable for individuals seeking to understand the capital market and the functioning of commercial banks. It highlights the importance of thoroughly assessing the relationship between risk and return, especially within the banking sector. Furthermore, it emphasizes the need to distinguish between systematic and unsystematic risks when evaluating commercial bank performance. By examining risk and return within Nepal's capital market, the study contributes to enhancing investors' analytical abilities, thereby supporting better investment decisions.

Risk and return analysis plays a crucial role in the investment decision-making process. It enables investors to assess the potential returns associated with various investment opportunities by examining past performance. This helps estimate the expected rate of return, which serves as an indicator of the possible reward for assuming investment risk. At the same time, the analysis aids in identifying the types of risks involved in different investments, allowing investors to evaluate whether these risks align with their risk tolerance.

Additionally, risk and return analysis supports effective portfolio diversification. By investing in a mix of assets with different risk levels, investors can reduce overall risk exposure while maximizing the potential for stable returns. This strategic approach minimizes the impact of losses from any single investment and enhances long-term portfolio performance. Through this analysis, investors can make informed decisions that match their financial goals, investment timelines, and tolerance for risk.

In the banking sector, risk and return analysis is equally important. It assists bankers in evaluating the creditworthiness of borrowers and the viability of investment opportunities. By understanding both the risks and the potential returns, banks can make prudent lending and investment choices. This helps mitigate losses and ensures a more sustainable return on investment. Banks can also use this analysis to manage their portfolios more effectively by balancing risk and return across different assets and loan categories.

Moreover, the analysis enables banks to develop strategies to manage the inherent risks associated with their operations. Through careful assessment of risk-return profiles, banks can make decisions that safeguard their financial stability while also supporting customer needs. This approach becomes especially important in a competitive financial environment, where aggressive lending without proper risk evaluation could lead to significant financial losses.

For individual investors, risk and return analysis is essential for financial planning and goal setting. It enables them to identify high-risk investments that may lead to losses and avoid them accordingly. The analysis also supports the creation of a diversified investment portfolio tailored to specific risk preferences and return expectations. In the context of retirement planning, it helps individuals balance risk to achieve their desired retirement income, ensuring long-term financial security.

The risk and return analysis is a critical tool for investors, bankers, and the general public. It facilitates informed decision-making, supports portfolio diversification, and aids in risk management. Whether in personal investing or institutional banking, understanding the interplay between risk and return allows stakeholders to make sound financial choices that align with their objectives and capacity for risk.

1.5 Limitation of the Study

Like all research, this study is subject to certain limitations. One of the primary constraints is the scope of data coverage.

- The analysis is based solely on relevant financial data and information collected over a ten-year period, specifically from the fiscal year 2012/13 to 2022/23. As a result, any trends or patterns outside this timeframe are not considered in the study.
- Only the secondary data is used for this study.
- The study is based on three commercial banks only.
- Return of stocks is based on price movement but omitted cash dividend.
- This study is primarily focused on examining the risk and return associated with the selected commercial banks, along with the valuation of their stocks. It does not extend to other financial or operational aspects of the banks.

CHAPTER-II
LITERATURE REVIEW

This chapter provides a comprehensive review of the relevant theoretical framework and previous studies related to the research topic. It is organized into three main sections: the conceptual review, the review of related studies, and the identification of the research gap. The conceptual review presents key definitions and summaries derived from various academic books and journal articles. The section on related studies includes an analysis of previously published research papers, journal articles, past study reports, and academic theses. Together, these sections help establish the foundation for the current study and highlight areas that require further investigation.

2.1 Theoretical Review

The analysis of risk and return serves as a core principle in finance, examining how the level of risk associated with an investment correlates with the potential return it may generate. Below, five prominent theories related to this concept are summarized, emphasizing their relevance in understanding risk and return dynamics.

A. Capital Asset Pricing Model (CAPM)

The capital asset pricing model (CAPM), introduced by William Sharpe in the 1960s, and provides a theoretical framework that defines a linear relationship between an asset's expected return and its market-related risk, represented by beta (β). According to CAPM, an asset's expected return is calculated as the sum of the risk-free rate and a risk premium, which reflects the asset's sensitivity to overall market movements. This model helps investors assess whether an investment offers adequate compensation for its level of risk, serving as a useful benchmark for evaluating investment performance.

In the context of Nepalese commercial banks, CAPM plays a crucial role in analyzing how their expected returns are shaped by their exposure to market risks. It allows for a clearer understanding of the link between a bank's risk profile and its performance relative to broader market trends. In Nepal's banking sector, CAPM's emphasis on systematic risk offers valuable insights, especially in a developing economy where market volatility can be pronounced. Commercial banks in Nepal typically face unique risk factors tied to political, economic, and regulatory environments. For instance, political instability can lead to increased risk perceptions, affecting the beta

of these banks. A bank with a high beta may experience more significant price fluctuations in response to market movements, and investors seeking higher returns would expect commensurate compensation for that risk.

As investors evaluate publicly traded commercial banks in Nepal, they often consider the expected return derived via CAPM. This model highlights how external economic factors in Nepal such as interest rate changes by the Nepal Rastra Bank, inflation rates, and macroeconomic conditions can influence banks' expected profitability. If a bank's expected returns do not adequately compensate for its risk as defined by its beta, investors may seek alternatives, thereby impacting the bank's market value and cost of capital.

The importance of CAPM in Nepal's banking sector lies in its ability to guide investment decisions and portfolio management, which is vital for attracting domestic and foreign investment during times of uncertainty.

B. Modern Portfolio Theory (MPT)

Modern Portfolio Theory (MPT), introduced by Harry Markowitz in 1952, provides a framework for constructing investment portfolios that aim to maximize expected returns relative to a given level of market risk. The theory highlights the importance of diversification as a strategy to minimize overall portfolio risk without necessarily reducing returns. By combining assets that are not strongly correlated, investors can create a more balanced portfolio, improving the return potential for the same level of risk. MPT emphasizes that investment risk should not be evaluated in isolation; rather, it is the collective behavior of assets within a portfolio that determines overall risk and return.

Modern Portfolio Theory (MPT) stresses the significance of diversification, a concept extremely pertinent to Nepal's commercial banking sector. With multiple banks operating in slightly varying contexts from urban to rural areas and differing risk appetite the importance of diversification becomes clear.

In the context of Nepal, commercial banks can effectively manage risk and return by diversifying their asset portfolios. This includes investments in various sectors such as tourism, agriculture, and remittances which constitute a significant portion of the economy. By spreading investments across these industries, banks can reduce unsystematic risk that might arise from sector-specific downturns.

Moreover, due to the small and developing nature of the Nepali financial system, banks face unique challenges like credit risk associated with borrowers in sectors like agriculture that are vulnerable to climate impacts. Modern Portfolio Theory offers a strategic approach for banks to enhance their investment portfolios by effectively managing risk and return through diversified asset allocation.

By adhering to MPT principles, commercial banks can construct portfolios that yield attractive returns without excessively increasing overall risk, which is crucial in maximizing shareholder value and maintaining financial stability, especially in the volatile market conditions of Nepal.

C. Arbitrage Pricing Theory (APT)

Arbitrage Pricing Theory (APT), developed by Stephen Ross in 1976, proposes that an asset's return can be estimated by examining its exposure to various macroeconomic factors that influence risk. Unlike CAPM, which relies on market risk, APT considers several systematic risks that may affect returns. This theory provides a more nuanced view of risk and return, as it allows for various influences on the expected return, making it a more flexible and comprehensive model.

Arbitrage Pricing Theory (APT) enhances the traditional single-factor CAPM by considering multiple risk factors that can influence bank returns, making it particularly applicable to commercial banks in Nepal. The banking sector faces diverse external influences, ranging from interest rate changes and economic policies to global financial trends.

For instance, the Nepalese banking system is significantly affected by local factors like changes in agricultural output, which ties closely to rural lending practices. As agricultural production becomes erratic due to climate change or policy shifts, the returns of banks heavily invested in agricultural loans may vary, which can be analyzed through APT.

Banks need to examine how sensitive their asset returns are to various macroeconomic factors. For example, banks can enhance their risk-return profile by identifying external shocks like remittance inflows or changes in monetary policy and adjusting their portfolios in anticipation of such changes. By assessing these multi-factor scenarios, banks in Nepal can position themselves more favorably amidst fluctuations that affect their expected returns.

APT informs Nepalese banks on strategic decision-making regarding asset classes, enabling a nuanced analysis of which external factors are most impactful. This allows for better alignment of their risk management frameworks with the dynamic economic environment.

D. Behavioral Finance and Risk-Return Analysis

Behavioral Finance provides insights into how psychological factors and biases influence investor behavior and market outcomes, challenging traditional financial theories that assume rational behavior. It emphasizes that risk perceptions and return expectations can be inherently irrational, leading to market inefficiencies. Understanding these behavioral biases helps investors recognize how they may misjudge risk and return, paving the way for more effective investment strategies.

Behavioral finance elucidates how psychological factors can lead to irrational investment decisions, affecting risk perceptions and return expectations. In the context of Nepal's commercial banking landscape, understanding behavioral finance offers insights into how bank managers and investors may make suboptimal financial decisions.

In Nepal, the banking sector often experiences volatility due to behavioral biases such as herd mentality, especially in response to political instability or economic crises. Investors may irrationally rush to sell shares during market downturns, not considering the fundamental value of the banks, which can create price distortions.

Commercial bank management can leverage principles from behavioral finance to mitigate risks associated with investor behavior. For instance, understanding that investors may overreact to negative news can encourage banks to communicate their financial stability and long-term strategic plans effectively through investor relations, dampening panic selling.

Behavioral finance also underscores the importance of investor education, encouraging rational decision-making. Consequently, Nepalese banks can implement financial literacy programs, helping consumers understand banking products better and fostering trust, which is crucial in retaining deposits and maintaining a stable customer base.

E. Efficient Market Hypothesis (EMH) Theories

The Efficient Market Hypothesis (EMH) asserts that all existing information is fully incorporated into asset prices. This notion holds significant implications for the commercial banking sector in Nepal, where transparency and information dissemination play crucial roles in influencing investor sentiment and bank valuations.

In Nepal's market context, the degree of efficiency may vary. The presence of numerous commercial banks, alongside regulatory frameworks established by the Nepal Rastra Bank, can determine how efficiently market information is absorbed. However, the market can be less efficient in regions where information asymmetry exists, affecting how investors price bank stocks.

As the banking sector evolves, factors like regulatory announcements, economic indicators, and macroeconomic performance become more critical in determining the risk-return landscape. Nepalese banks must navigate these dynamics, ensuring proactive responsiveness to regulatory changes and market signals to maintain competitiveness.

If the Nepalese banking market is efficient, investors in these banks should find it challenging to consistently outperform the market through individual stock selection. Instead, banks can focus on providing consistent returns through sound management practices and operational efficiency, which can help them stay competitive within an efficient market environment.

When applied to Nepalese commercial banks, the theories of risk and return provide valuable insights into their financial performance and investment decisions, illustrate the dynamic interplay of various factors influencing investment decisions, risk perceptions, and expected returns. Each theory presents unique insights that can help bank management and investors navigate the complexities of the financial landscape in Nepal.

As the banking sector matures and evolves, understanding these theoretical foundations can promote better investment strategies, risk management practices, and overall stability within the financial system. This understanding is particularly pertinent in Nepal's context, characterized by unique challenges and opportunities typical of a developing economy, thereby paving the way for more informed decision-making and strategic planning in the commercial banking sector.

2.2 Conceptual Review

2.2.1 Concept of Commercial Bank

A commercial bank serves as a key financial entity, playing an essential role in the economy by providing services such as lending, deposit management, and facilitating payments. These banks generate revenue primarily through interest on loans, contributing to economic development by facilitating credit access (Madura, 2021).

2.2.2 Development of Capital Market in Nepal

The development of Nepal's capital market began in 1937 with the issuance of shares by Biratnagar Jute Mills Ltd. and Nepal Bank Ltd. Significant developments include the founding of the Securities Exchange Center in 1976, which later evolved into the Nepal Stock Exchange (NEPSE) in 1993. The 1990s liberalization of the financial sector further spurred growth, supported by regulatory bodies such as the Securities Board of Nepal (Shrestha, 2019).

2.2.3 Concept of Investment

Investment involves allocating resources to financial instruments like stocks or bonds with the aim of generating returns. Investors must balance risk and return, with markets divided into primary (issuance of new securities) and secondary markets (trading of existing securities). Markets are further categorized into money markets for short-term assets and capital markets for long-term securities (Reilly & Brown, 2020).

2.2.4 Investment Options in Nepal

Investment options in Nepal include common stock, preferred stock, bonds, treasury bills, and mutual funds. While common stock dominates the market, instruments like treasury bills are vital for liquidity and government financing. Mutual funds offer diversification benefits, making them appealing to small investors (Shrestha, 2019).

2.2.5 DEMAT Account

DEMAT accounts enable electronic storage of securities, facilitating efficient trading in Nepal's stock market. They are essential for participating in both primary and secondary markets, requiring a CASBA Registration Number (CRN) for seamless transactions (Securities Board of Nepal, 2022).

2.2.6 Credit Rating Agencies

Credit rating agencies in Nepal, such as ICRA Nepal (established in 2011) and CARE Ratings Nepal (licensed in 2017), provide independent evaluations of creditworthiness. These agencies are integral for informed investment decisions and maintaining market transparency (ICRA Nepal, 2023).

2.2.7 ASBA and C-ASBA

ASBA (Applications Supported by Blocked Amount) and its online counterpart C-ASBA streamline IPO applications by allowing investors to block funds instead of transferring them, ensuring secure and efficient participation in public offerings (Nepal Rastra Bank, 2021).

2.2.8 Security Analysis and Portfolio Management

2.2.8.1 Security Analysis

Security analysis aims to evaluate the intrinsic value of financial instruments. Fundamental analysis focuses on economic factors, company performance, and management quality, while technical analysis examines price trends and market behaviors through charts. Both approaches help investors make informed decisions (Reilly & Brown, 2020).

2.2.8.2 Role of NEPSE Index in Investment Decisions

The NEPSE index reflects market performance, aiding investors in assessing opportunities. It supports capital mobilization, facilitates economic growth, promotes corporate governance, and provides platforms for raising funds, benefiting both investors and companies (Shrestha, 2019).

2.2.9 Meaning of Risk

Risk represents uncertainty in achieving desired investment outcomes, encompassing potential losses. Systematic risks, such as economic or political factors, are market-

wide and unavoidable, while unsystematic risks, specific to industries or companies, can be mitigated through diversification (Madura, 2021).

2.2.10 Sources of Risk

Risk sources include interest rate fluctuations, inflation, market trends (bull and bear risks), and default on obligations, liquidity issues, industry-specific challenges, and political instability. Effective risk management involves recognizing and mitigating these elements to stabilize returns (Reilly & Brown, 2020).

2.2.11 Meaning of Return

Return refers to the profit or loss generated by an investment over a defined period, determined by evaluating cash inflows, changes in asset value, and the initial investment costs. Short-term returns focus on immediate cash inflows, while long-term returns emphasize growth (Bodie et al., 2021).

2.2.12 Risk and Return Relationship

The connection between risk and return highlights the necessity of higher returns as compensation for taking on increased levels of risk. Stocks, with higher variability, typically offer greater potential returns than bonds, which provide stable but limited gains (Bodie et al., 2021).

2.2.13 Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) calculates the expected return on an investment based on its exposure to systematic risk, under the assumption that diversification eliminates unsystematic risk. The model's Security Market Line (SML) and Capital Market Line (CML) illustrate the trade-off between risk and return, providing a framework for constructing efficient portfolios (Sharpe et al., 1999).

2.3 Empirical Review

Goetzmann and Jorin (2025) investigated the ability of dividend yields to predict stock returns over a long horizon. Their study found no substantial statistical evidence supporting the use of dividend yields as a reliable predictor for stock returns. From the studies reviewed, it is evident that stock returns are influenced by a variety of fundamental financial factors. However, most empirical research has focused on testing the impact of these fundamental variables on stock returns using cross-sectional data. The literature has paid significant attention to analyzing the

relationship between various financial metrics, such as book-to-market ratios, price-to-earnings ratios, market capitalization (size), earnings yield, cash flow yield, profitability, and leverage, with stock returns. In general, the findings indicate a positive correlation between book-to-market ratios, earnings yield, cash flow yield, profitability, and leverage with stock returns. Additionally, a strong negative relationship between market size (market capitalization) and average returns has been observed by many researchers. Furthermore, expected returns are typically more accurately explained by dividend payout ratios than by earnings alone. While many studies have been conducted in the context of developed and large-capital markets, the relevance and applicability of these findings to small and underdeveloped capital markets, such as Nepal, remain unclear.

Awalakki (2024) focused on the analysis of mean returns and risks (using standard deviation**)** of selected stocks listed on the National Stock Exchange (NSE)**.** This study primarily aimed to provide investors with insights into the relationship between sector-specific returns and volatility**.** The major finding revealed that stocks, like JKTyre Ltd, exhibited high returns but also high risks, illustrating the trade-off between risk and return typical in equity markets.

Khan and Ali (2023) focused on risk and return analysis within fixed income investments, such as bonds. They provided a comprehensive review of the importance of interest rate and credit risks in determining bond yields and prices. The study found that duration matching**,** immunization**,** and credit analysis are essential strategies to mitigate risks, particularly those associated with interest rate movements.

Alnafisah and Alrabiah (2022) examined alternative investment options, such as hedge funds, private equity, and real estate, and discussed several techniques for assessing risk and return, including historical analysis, scenario analysis, and Monte Carlo simulations. They highlighted that these types of investments tend to exhibit greater volatility, making them more appropriate for investors who have a higher tolerance for risk.

Khan and Ahmed (2022) highlighted the challenges in equity investments, particularly the volatility observed in the technology and automobile sectors, which mirrors the findings of Awalakki in terms of risk levels associated with higher returns.

Mok and Sung (2021**)** analyzed Real Estate Investment Trusts (REITs)**,** highlighting how macroeconomic factors**,** particularly interest rates**,** significantly affect the risk-return profile of equity and mortgage REITs**.**

Nafees and Firdouse (2021) conducted an analysis of the risk and return associated with crypto currency investments, offering an in-depth review of existing literature on the subject. The authors explore the distinctive characteristics of crypto currencies and address the challenges involved in assessing risk and return within this evolving asset class. The paper begins with an introduction to crypto currencies and their growing popularity as an investment asset. The authors then discuss the unique features of crypto currencies, such as their decentralized nature, anonymity, and lack of regulation. They also highlight the challenges of measuring risk and return in this context, such as the high volatility of crypto currency prices and the lack of historical data. The authors provide a comprehensive review of the literature on risk and return in crypto currency investments, exploring key topics such as the relationship between risk and return in crypto currencies, the influence of macroeconomic factors on these variables, and various methods used to assess risk and return in this area. They also address the limitations of traditional risk and return metrics when applied to crypto currencies, emphasizing the need for novel approaches to risk management within this emerging asset class.

Kar and Dharmapala (2021) analyzed the Risk and Return in Private Equity, provides a comprehensive review of the literature on risk and return analysis in private equity. The authors discuss the unique characteristics of private equity investments, the challenges of measuring risk and return in this asset class, and the different methods used to evaluate the performance of private equity investments.

The paper begins with an introduction to private equity investments and their role in the financial markets. The authors then discuss the challenges of measuring risk and return in private equity, including the difficulty in obtaining accurate data and the lack of transparency in private equity transactions. The authors also examine various methods employed to assess the performance of private equity investments, including the internal rate of return (IRR), multiple of invested capital (MOIC), and public market equivalent (PME).

Authors then review the literature on the performance of private equity investments, covering topics such as the persistence of performance, the impact of fees, and the role of leverage. They also examine the performance of private equity investments during different market environments, such as bull and bear markets.

One of the strengths of this article is its focus on the challenges of measuring risk and return in private equity, which is a topic that is often overlooked in the literature. The authors provide a clear and detailed explanation of these challenges, as well as the different methods used to address them. Additionally, the paper is well-organized and easy to follow.

However, one potential limitation of this paper is its narrow focus on private equity, which may limit its applicability to other types of alternative investments. Additionally, the authors do not provide specific recommendations for investors or fund managers, which may limit the practical usefulness of the article.

Overall, "A Review of Risk and Return Analysis in Private Equity" is a valuable resource for anyone interested in private equity and risk and return analysis. The authors provide a thorough review of the literature and offer insights into the challenges of measuring risk and return in this asset class.

Sharma and Bhattacharya (2020) analyzed the Risk and Return of Environmental, Social, and Governance (ESG) investing, provides a comprehensive review of the literature on risk and return analysis in ESG investing. The authors discuss the unique characteristics of ESG investing, the challenges of measuring risk and return in this context, and the different methods used to evaluate the performance of ESG investments.

The paper begins with an introduction to ESG investing and its growing importance in the financial markets. The authors then discuss the challenges of measuring risk and return in ESG investing, including the lack of standardized metrics and the difficulty in quantifying the impact of ESG factors on investment performance. They also explore the different methods used to evaluate the performance of ESG investments, such as the ESG scorecard and the ESG factor model.

The authors then review the literature on the performance of ESG investments, covering topics such as the relationship between ESG factors and financial

performance, the impact of ESG integration on portfolio risk and return, and the role of ESG in achieving sustainable development goals.

One of the strengths of this article is its focus on the unique characteristics of ESG investing and the challenges of measuring risk and return in this context. The authors provide a clear and detailed explanation of these challenges, as well as the different methods used to address them.

However, one potential limitation of this paper is its focus on the academic literature, which may limit its practical usefulness for investors and fund managers. Additionally, the authors do not provide specific recommendations for investors or fund managers, which may limit the practical applicability of the article.

Overall, "risk and return analysis of environmental, social and governance (ESG) Investing" is a valuable resource for anyone interested in ESG investing and risk and return analysis. The authors provide a thorough review of the literature and offer insights into the challenges of measuring risk and return in this context.

Hussain and Jafar (2020) analyzed the risk and return in Islamic finance, provides a comprehensive review of the literature on risk and return analysis in Islamic finance. The authors discuss the importance of risk management in Islamic finance, the challenges of measuring risk and return in this context, and the role of Islamic finance principles in guiding investment decisions.

The paper begins with an introduction to Islamic finance and its unique features, including the prohibition of interest-based transactions and the emphasis on social justice and ethical behavior. The authors then discuss the importance of risk management in Islamic finance, highlighting the need for Shariah-compliant risk management practices.

The literature on risk and return in Islamic finance has been extensively examined, focusing on several key areas. Researchers have explored how risk and return are interrelated within the context of Islamic financial systems, analyzed the influence of macroeconomic variables on this relationship, and considered how Islamic principles shape investment behavior. In addition, various methodologies for assessing risk and return in Islamic finance have been evaluated, including tools such as the Sharpe ratio and the value-at-risk (VaR) model.

One of the strengths of this article is its focus on the unique features of Islamic finance and the challenges of measuring risk and return in this context. The authors provide a clear and detailed explanation of these challenges, as well as the different methods used to address them. Additionally, the paper is well-organized and easy to follow.

However, one potential limitation of this paper is its focus on the academic literature, which may limit its practical usefulness for investors and fund managers. Additionally, the authors do not provide specific recommendations for investors or fund managers, which may limit the practical applicability of the article.

Overall, "A Review of Risk and Return Analysis in Islamic Finance" is a valuable resource for anyone interested in Islamic finance and risk and return analysis. The authors provide a thorough review of the literature and offer insights into the challenges of measuring risk and return in this context. The paper also highlights the importance of Shariah-compliant risk management practices and the role of Islamic finance principles in guiding investment decisions.

Abbas and Hussain (2020) evaluated the risk and return tradeoff in international stock markets of risk and financial management in 2020, provide an extensive literature review on the risk and return tradeoff in international stock markets. The authors discuss the factors that influence this relationship, such as economic conditions, political stability, and market structure.

The article begins with an overview of the risk and return tradeoff and the importance of understanding this relationship for investors and portfolio managers. The authors then discuss the different factors that influence this relationship in international stock markets, such as macroeconomic factors, company-specific factors, and market structure. They also discuss the impact of these factors on the risk and return tradeoff and highlight the need for a comprehensive understanding of these factors to make informed investment decisions.

One of the strengths of this article is its comprehensive review of the literature on the risk and return tradeoff in international stock markets. The authors provide a thorough analysis of the different factors that influence this relationship and offer insights into how these factors can be used to make investment decisions. Additionally, the paper is well-organized and easy to follow.

However, one potential limitation of this paper is its focus on the academic literature, which may limit its practical usefulness for investors and portfolio managers. Additionally, the authors do not provide specific recommendations for investors or portfolio managers, which may limit the practical applicability of the article.

Overall, "A Review of Risk and Return Tradeoff in International Stock Markets" is a valuable resource for anyone interested in international stock market investment and the risk and return tradeoff. The authors provide a comprehensive review of the literature and offer insights into the factors that influence this relationship. The paper also highlights the need for a comprehensive understanding of these factors to make informed investment decisions.

Tariq and Butt (2020) examined the risk and return in portfolio management, provide an overview of the key concepts and techniques of risk and return analysis in portfolio management.

The article examines different risk measurement tools such as standard deviation, beta, and value at risk as well as various methods for evaluating returns, including total return, dividend yield, and capital gains. The authors also discuss the importance of considering the risk-return trade-off in portfolio management and the role of diversification in reducing risk.

The study highlights the benefits of using modern portfolio theory (MPT) to optimize portfolios based on risk and return characteristics. Modern Portfolio Theory (MPT) takes into account the interrelationship between asset returns and seeks to either optimize returns for a specified level of risk or minimize risk for a targeted level of return. According to the authors, MPT has seen broad application in portfolio management and has demonstrated its usefulness in enhancing returns while mitigating risk.

The article also discusses the limitations of risk and return analysis, such as the assumptions underlying MPT, the challenges of predicting future returns and risks, and the limitations of historical data in forecasting future trends. The authors suggest that investors should be aware of these limitations and use risk and return analysis as a guide, rather than a definitive solution, in making investment decisions.

Overall, the article provides a comprehensive overview of risk and returns analysis in portfolio management and highlights the importance of considering risk and return in

investment decision-making. However, the study does not present any new empirical findings and is mainly a synthesis of existing literature. Nonetheless, it is a useful resource for students and practitioners interested in the topic of risk and return analysis in portfolio management.

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Lim and K.C. (2020) examines the risk and return of socially responsible investing, examines the risk and return characteristics of socially responsible investing (SRI). The authors use a sample of 306 SRI funds from 2006 to 2016 and employ a variety of statistical techniques to analyze the risk and return profiles of these funds. The study finds that SRI funds have slightly lower returns and higher risk than non-SRI funds. However, the authors note that the differences in returns and risk are relatively small and may be outweighed by the non-financial benefits of SRI, such as ethical considerations and environmental or social impact.

The study also finds that SRI funds have a lower exposure to some industries, such as fossil fuels and weapons, and a higher exposure to other industries, such as technology and healthcare. The authors argue that this may lead to more diversified portfolios and lower systemic risk.

The article offers meaningful perspectives on the risk and return profiles of Socially Responsible Investments (SRI), emphasizing the relevance of incorporating non-financial criteria into investment decision-making. Nevertheless, certain limitations are acknowledged, including the use of a relatively brief time frame and a concentration on funds based in the United States, which could restrict the broader applicability of the results.

Despite these limitations, the article contributes to the growing literature on SRI and offers useful information for investors interested in this asset class. It also raises important questions about the trade-offs between financial and non-financial considerations in investment decision-making.

Das and Ghosh (2019) examine the risk and return of emerging market bonds explores the risk and return characteristics of emerging market bonds in comparison to developed market bonds. The authors use monthly data from 2003 to 2018 to analyze the performance of bonds from emerging market economies. They apply various statistical techniques, including mean-variance optimization, to estimate the risk and return profiles of the bonds.

The study observed that bonds from emerging markets tend to yield greater returns compared to those from developed markets; however, this advantage is accompanied by an increased level of risk. The authors attribute this to the economic and political instability often associated with emerging markets. They also find that the risk and

return profiles of emerging market bonds are highly dependent on the underlying country's macroeconomic conditions.

Overall, the research offers important insights into the risk-return dynamics of emerging market bonds and underscores the need to account for macroeconomic influences when evaluating such investments. However, the applicability of the findings may be limited, as they might not reflect conditions across all emerging market economies. Additional studies are necessary to gain a more comprehensive understanding of the risks and potential returns associated with this asset class.

Wiley and Hudson, (2019) made an empirical analysis of Risk and Return in US Residential Real Estate Markets, examines the relationship between risk and return in the US residential real estate market.

The study uses data on housing prices, rents, and other economic variables from 1986 to 2016 for 49 US states. The authors analyze the relationship between risk, as measured by volatility in house prices, and return, as measured by capitalization rates (i.e., the ratio of net operating income to property value) for residential real estate investments.

The authors find a positive relationship between risk and return in the US residential real estate market. They find that states with higher volatility in house prices tend to have higher capitalization rates, indicating higher expected returns for investors. The study also finds that rental income is an important factor in determining the risk and return profile of residential real estate investments.

The articles provides valuable insights into the risk and return characteristics of the US residential real estate market and highlights the importance of considering market volatility and rental income when making investment decisions. The study also contributes to the broader literature on asset pricing and portfolio management.

However, the study has some limitations. For example, the data used in the analysis only covers a relatively short time period, and the analysis does not account for the heterogeneity of the US residential real estate market, such as regional differences. Additionally, the study does not consider the impact of transaction costs, financing costs, or taxes on investment returns.

Overall, the study an empirical analysis of risk and return in US residential real estate markets provides helpful insights for investors and policymakers interested in the US

housing market. However, further research is needed to fully understand the risk and return characteristics of this asset class.

The relationship between risk and return in Islamic equity markets was evaluated by Rahman and Rashid (2018). Their study focused on six key Islamic equity markets Indonesia, Malaysia, Pakistan, Qatar, Saudi Arabia, and Turkey using data from 2005 to 2015. They assessed risk through the standard deviation of returns and measured return using both the market risk premium and the Sharpe ratio. By analyzing these indicators, the authors aimed to understand how risk and return interacted across the selected markets.

The study finds a positive relationship between risk and return in Islamic equity markets, indicating that higher risk is associated with higher returns. However, the authors also find that the risk-return relationship is weaker in Islamic equity markets compared to conventional equity markets. This suggests that the risk-return trade-off may be different in Islamic equity markets due to their unique characteristics.

The authors also explore the impact of Shariah-compliant screening on the risk-return relationship. They find that firms that are compliant with Shariah principles tend to have lower levels of risk, but this does not necessarily translate into lower returns. The study suggests that the lower risk may be due to the fact that Shariah-compliant firms tend to have lower levels of debt and are more financially stable.

Overall, the studies provides valuable insights into the risk and return characteristics of Islamic equity markets and highlights the importance of considering the unique features of these markets when making investment decisions. However, the study has some limitations, such as a focus on a relatively small number of markets and a short time period, which may limit the generalizability of the findings.

Despite these limitations, the article contributes to the growing literature on Islamic finance and offers useful information for investors interested in this asset class. It also raises important questions about the role of Shariah-compliant screening in investment decision-making and its impact on risk and return.

Wagner (2016) examined the unique characteristics of bank financial statements and pointed out that analyzing them presents different challenges compared to those of manufacturing or service-based companies. Because of the distinct nature of banking

operations, financial statement analysis for banks requires a tailored approach that accounts for their specific risks.

Banks operate by collecting deposits from savers, on which they may pay interest, and then lending those funds to borrowers, from whom they earn interest. The difference between the interest paid and the interest received known as the interest rate spread—is a primary source of profit for banks. This constant movement of funds between depositors and borrowers creates the dynamic cash flow system that defines banking. By effectively managing this flow, banks act as intermediaries, generating income while taking on credit-related risks.

A detailed examination of a bank's financial statements can help identify critical elements that should be evaluated before making investment or trading decisions. Investors need to understand macroeconomic indicators, particularly the business cycle and the yield curve, as these significantly influence a bank's financial performance.

Interest rate risk and credit risk are especially important. When the yield curve flattens or becomes inverted, a bank's net interest revenue tends to come under pressure. In contrast, when the yield curve returns to its typical upward slope, this revenue generally improves. Among these risks, credit risk often poses the greatest threat to a bank's performance, potentially leading to significant financial losses. Furthermore, the assessment and management of credit risk can be subjective and may be manipulated in the short term, which makes it crucial for investors to remain cautious.

The concept of "sinful stocks" is also relevant in ethical investing discussions. According to Investopedia, a sinful stock refers to shares of a company involved in activities considered unethical or immoral. However, defining what is ethical or not can vary widely among investors. For example, some may see certain types of advertising as unethical and label related companies as sinful, while others may see no ethical issue at all. This variation highlights the gray area in what constitutes a sinful investment, making it a highly subjective matter.

William (2016) discussed how both individual and institutional investors such as pension funds and mutual funds typically manage portfolios composed of a variety of securities. Over the past four decades, significant progress has been made in the field of investment research, particularly in the development of modern portfolio

management theories. The focus of this work is to introduce these advanced methods and to address a fundamental question: what rate of return must an investor expect to justify including a risky asset in their portfolio? To answer this, it is essential to first understand the preferences and expectations of investors, as well as how concepts like "return" and "risk" are defined and measured within the context of portfolio theory.

Yimka (2016) conducted a study to explore the relationship between risk management and the financial performance of ten selected commercial banks in Nigeria. The research focused on assessing how credit risk management contributes to value creation within these institutions. Key concepts, theories, legal frameworks, and standards related to credit risk management were reviewed. Based on this foundation, a conceptual model was developed that identified four main indicators of credit risk: loan and advance loss provisions, total loans and advances, non-performing loans, and total assets. These variables were analyzed in relation to two key financial performance metrics Return on Equity (ROE) and Return on Assets (ROA).

The study utilized panel data collected from ten commercial banks listed on the Nigerian Stock Exchange (NSE) over the period from 2006 to 2015. The findings indicated that credit risk management significantly influences the financial performance of commercial banks. Specifically, maintaining a low ratio of non-performing loans to provisions for loans and advances was shown to have a positive impact on ROE. Conversely, a higher proportion of non-performing loans reduced ROE and weakened overall financial performance. The analysis also revealed that directing a greater portion of total assets into productive loans and advances can enhance financial outcomes, while excessive provisioning for loan losses may limit profitability.

At a 5% significance level, the overall effect of the credit risk management practices examined in the study was found to be statistically significant. As a result, the study recommended that banks aim to minimize non-performing loans relative to their provisions, limit the share of total loans requiring loss provisions, and ensure a healthy proportion of total assets are allocated to income-generating loans and advances. These measures are expected to improve return on equity and strengthen the financial performance of commercial banks.

Elton (2016) critically assessed the use of realized returns as a proxy for expected returns in asset pricing models. The traditional approach assumes that, over time, unexpected information balances out, making the average realized return a reliable and unbiased estimate of the expected return. However, Elton challenged this assumption, arguing that substantial evidence contradicts it. He pointed out that there have been periods exceeding ten years during which average realized returns in the stock market fell below the risk-free rate. Additionally, over periods longer than 50 years, long-term risky bonds have, on average, also underperformed compared to risk-free assets.

According to Elton, the assumption that a risky asset should consistently yield a return above the risk-free rate is too weak to justify using realized returns as a stand-in for expected returns. He emphasized that if such a basic condition fails to hold over decades, the reliability of realized returns as a proxy becomes highly questionable. Recent market behavior supports his argument: while U.S. stock markets have experienced annual returns exceeding 30% in certain years, several Asian markets have simultaneously posted negative returns. These discrepancies further highlight the limitations of relying solely on realized returns in asset pricing analyses.

Krishnaprabha and Vijayakumar (2015) conducted an analysis of risk and return for selected stocks in the Indian market. Their study emphasized the critical role that risk-return evaluation plays in the investment decision-making process. It was concluded that while all investors aim to minimize risk and maximize returns, this goal often requires accepting a certain level of risk in exchange for potentially higher returns.

The authors highlighted the general principle that risk and return are directly related higher returns typically demand higher risk. However, their sector-specific findings showed notable deviations from this rule. In sectors such as banking and automobiles, high levels of risk were found to be associated with lower returns. Conversely, industries like information technology, fast-moving consumer goods (FMCG), and pharmaceuticals demonstrated that lower risk could yield higher returns.

Additionally, the analysis revealed that certain stocks with positive alpha were not strongly correlated with overall market movements, indicating their potential to deliver returns independently of broader market trends. These findings suggest that

careful stock selection, based on risk and return characteristics, can enhance investment outcomes.

Table 1

Summary of Empirical Review

Author	**Objective of the study**	**Methodology**	**Finding**
Goetzmenn and Jorin (2025)	To examine the ability of dividend yields to predict long horizon stock return	Statistical analysis of mean, standard deviation (risk), correlation and regression analysis was used.	The findings in general reveal positive relation of book market, earning yield, earning price, cash flow yield and profitability leverage with stock return.
Awalakki (2024)	To analyze mean returns and risks of stocks listed on the National Stock Exchange (NSE) with sector-specific focus.	Statistical analysis of mean returns and standard deviation (risk) of selected stocks.	JK Tyre Ltd showed the highest return (119.166) but also the highest risk. Importance of aligning risk tolerance with sector-specific strategies.
Khan and Ali (2023)	To review risk and return analysis in fixed income investments.	Literature review on risk management techniques in fixed income investments, including duration and credit analysis.	Techniques like duration matching and immunization are vital in managing risks. Yield is a key return measure.
Alnafisah and Alrabiah (2022)	To review risk and return analysis of alternative investments like hedge funds, private equity, real estate, and commodities.	Literature review on risk and return measurement techniques like historical analysis, scenario analysis, and Monte Carlo simulation.	Comparison of alternative investments to traditional assets; focuses on various measurement techniques.
Khan and	To explore the	Review of	Discussed performance

Ahmed (2022)	challenges of measuring risk and return in hedge funds.	hedge fund performance, including alpha, beta, and Sharpe ratio analysis.	persistence, the impact of fees, and benchmarking challenges in hedge fund performance.
Mok and Sung (2021)	To review risk and return analysis in Real Estate Investment Trusts (REITs).	Literature review and performance evaluation using measures like standard deviation, beta, and Sharpe ratio.	Relationship between interest rates and REIT performance; impact of macroeconomic factors.
Nafees & Firdouse (2021)	To review risk and return analysis in crypto currency investments.	Literature review on the unique risks of crypto currencies, including volatility and lack of historical data.	High volatility and decentralized nature increase risks; need for new methods of risk management.
Kar and Dharmapala, (2021)	To review risk and return analysis in private equity.	Literature review on risk management in private equity, including IRR and MOIC metrics.	Focus on data inaccuracy, lack of transparency, and leverage fees impacting private equity performance.
Sharma and Bhattacharya (2020)	To explore risk and return dynamics in ESG investing.	Literature review of ESG investment metrics, including ESG scorecards and factor models.	ESG funds tend to have lower returns and higher risks; non-financial benefits may outweigh financial trade-offs.
Hussain and Jafar (2020)	To review risk and return analysis in Islamic finance.	Literature review on Shariah-compliant investment strategies and	Islamic finance emphasizes ethical behavior; Shariah-compliant firms generally have lower risk.

		risk management methods like value-at-risk.	
Abbas and Hussain (2020)	To review the risk-return tradeoff in international stock markets.	volatility in house prices, and return, as measured by capitalization rates	Risk-return tradeoff is influenced by macroeconomic and political factors.
Tariq and Butt (2020)	To examine risk and return analysis in portfolio management.	Overview of portfolio management theory with an emphasis on diversification and the Sharpe ratio.	Diversification is key to reducing risk in portfolio management; highlights the importance of risk-return trade off.
Lim and K. C. (2020)	To analyze risk and return in socially responsible investing (SRI).	Literature review on SRI funds, comparing returns and risks with non-SRI funds.	SRI funds generally have lower returns and higher risks compared to non-SRI funds. Non-financial benefits may outweigh financial trade-offs..
Das and Ghosh (2019)	o analyze risk and return of emerging market bonds.	Comparative analysis of emerging market bonds vs. developed market bonds based on economic and political factors.	Emerging market bonds offer higher returns but also come with higher risks, particularly due to economic instability.
Wiley and Hudson (2019)	To analyze risk and return in U.S. residential real estate markets.	Empirical analysis of U.S. residential real estate market using volatility and capitalization rates.	Positive relationship between risk (house price volatility) and return (capitalization rates).
Rahman and Rashid (2018)	To explore risk and return in Islamic equity markets.	Empirical analysis of Islamic equity markets across six	Positive risk-return relationship, but weaker in Islamic markets. Shariah-compliant firms have lower risk, but not

		countries.	necessarily lower returns.
Wagner (2016)	To analyze risks in a bank's financial	Analytical review of financial statements, focusing on interest rate and credit risk.	Focus on interest rate and credit risk; profitability depends on the spread between rates.

2.2.1 Review of Literature in Nepalese Context

Joshi (2025) conducted an analysis of the risk and return characteristics of common stocks from five listed commercial banks. The primary aim of the study was to evaluate the risk associated with returns on common stock investments using selected analytical tools. The research utilized fifteen years of data spanning from 2008/09 to 2023/24. For the analysis, both financial and statistical methods were applied. The arithmetic mean was used to calculate returns, while standard deviation and coefficient of variation measured unsystematic risk. Additionally, the beta coefficient was employed to assess the sensitivity or volatility of each bank's stock relative to the market. Correlation analysis was performed to determine the relationship between risk and return, and hypothesis testing was conducted using the t-test. The study's key findings showed that the banking sector had an expected return of 21.77%, a risk level of 36.10%, and a coefficient of variation (CV) of 1.66. Similarly, the finance and insurance sector exhibited the same figures. In contrast, the hotel sector recorded an expected return of 10.16%, a risk of 72.40%, and a CV of 7.12, while the trading sector showed 6.86% return, 80.68% risk, and 11.76 CV. Other sectors experienced a negative return of -16.61%, risk of 50.45%, and CV of 3.04. Regarding the overall market, the expected return was 10.20%, with a risk of 39.57% and a CV of 3.88. The study also found that SCBL held the largest market capitalization, closely followed by NBBL. Moreover, the NEPSE index was significantly influenced by the banking sector's performance. Based on these results, the study suggests that investors seeking higher returns should be prepared to accept higher risks and consider investing in SCBL shares. Conversely, risk-averse investors preferring single-asset investments may opt for shares of NIBL or HBL, as these stocks present lower risk than the overall portfolio.

Pandeya and Shrestha (2024) explored the risk-return characteristics of Nepalese financial institutions between 2016 and 2022. Their findings indicated that

commercial banks displayed higher volatility in their stock prices compared to development banks and finance companies. Moreover, their research found that commercial and development banks' stock prices were often overvalued, while some finance companies were undervalued, suggesting opportunities for diversification within the market.

Kandel (2024) highlighted the tendency of Nepali investors to undervalue the importance of risk-return analysis, particularly in the context of investing in commercial bank stocks. Kandel argued that Nepali investors are often focused on individual securities rather than the risk-return profile of diversified portfolios, underscoring the need for more investor education and awareness.

Bhattarai (2020) discovered that non-performing loans (NPLs) have a detrimental effect on the return on equity (ROE) of commercial banks. The research also identified a positive correlation between the size of a bank and its ROE, suggesting that larger banks may be better equipped to reduce the adverse impact of NPLs on their profitability.

Gnawali (2018) expanded on this issue by demonstrating how high levels of NPA in Nepalese banks undermine profitability. The findings underscored the significant negative effect of NPA on the overall financial health of commercial banks, making it a critical factor for consideration in the risk-return analysis

Bhattarai (2017) investigated how non-performing loans (NPLs) influence the profitability of commercial banks in Nepal. The study utilized pooled data from fourteen commercial banks, covering 77 observations between 2010 and 2015. The regression analysis indicated that the banks' profitability, measured by return on assets (ROA), was adversely impacted by the non-performing loan ratio. Interestingly, the non-performing loan ratio showed a positive effect on shareholders' return on equity (ROE). Additionally, the findings revealed that bank size significantly and positively influenced profitability, as reflected in both ROA and ROE. The study concluded that the profitability of Nepalese commercial banks is affected not only by the NPL ratio but also by other factors such as the size of the banks.

Khadka (2016) found that shares in the commercial banking sector offer attractive investment opportunities for Nepalese investors, suggesting that this sector provides relatively safer options. The covariance and beta coefficients of the commercial

banking sector in relation to the overall market also indicate favorable conditions for general investors. Within the sector, shares of EBL are recommended due to their lower coefficient of variation compared to other sampled banks. On the other hand, NABIL, NIBL, and BOK are currently considered riskier investments compared to other selected banks. The study emphasizes that investors should carefully assess their personal risk tolerance, preferences, and needs before investing in the stock market. It also recommends that investors engage in thorough discussions with stakeholders and base their decisions on reliable information rather than rumors or speculation.

Shakya (2015) conducted an evaluation of the risk and return associated with six commercial banks, which is relevant to this study. The research covered a period of five years, utilizing secondary data for analysis. The study aimed to assess the risk and return of the selected banks (six out of twenty-seven) and to analyze their coefficients of variation. Additionally, it examined the sensitivity of the stock prices of these banks, as well as the overall banking sector, in relation to the NEPSE index. The research also aimed to offer valuable recommendations regarding the risk and return of commercial bank stocks, which could assist investors in making informed investment decisions.

Gautam (2014) investigated the profit planning system at Himalayan Bank Limited (HBL) over a five-year period from FY 2058/059 to 2062/063. The study relied on secondary data to evaluate the effectiveness of HBL's profit planning and practices. Several key findings emerged from the research. Notably, HBL conducts a SWOT analysis prior to developing its profit plans. The bank employs three core planning teams responsible for creating plans, policies, programs, and budgets. Additionally, HBL uses two planning formulation methods: seminars held at the head office and seminars conducted at regional offices. The primary goal of HBL's profit plan is to achieve a 4 percent profit on outstanding balances.

Sharma (2012) conducted an analysis of risk and return for commercial banks in Nepal, focusing on the annual average returns of these banks. The study utilized data spanning ten years, from 2000 to 2010. Various financial and statistical tools, including calculations of return, standard deviation, coefficient of variation, and beta coefficient, were employed for the analysis. The findings revealed that the average returns for NABIL, HBL, NIB, and EBL were 33%, 29.3%, 15.65%, and 48.7%, respectively. Everest Bank recorded the highest return, while NIB showed the lowest

return during the year 2004/05. Notably, NABIL, HBL, and EBL experienced negative annual returns in some years, whereas NIB maintained positive returns during those periods. Specifically, HBL had negative returns in 2001/02, and NIB experienced negative returns in 2002/03, 2003/04, and 2006/07. The standard deviations for NABIL, HBL, NIB, and EBL were found to be 0.5534, 0.442, 0.388, and 0.782, respectively. Additionally, the beta coefficients for these banks were 0.15 for NABIL, 0.3696 for HBL, 0.195 for NIB, and 0.0212 for EBL.

Sapkota (2010) conducted a study on the risk, return, and optimal portfolio creation for common stock investments, focusing on six commercial banks: SBI, NABIL, BOK, NIC, EBL, and SCBL. The primary objectives were to assess the risk and return characteristics of these stocks and to provide recommendations on forming an optimal investment portfolio from the selected banks. The study also analyzed the trends in the overall market, banking index, and the stock prices of the chosen banks.

The analysis showed that BOK's common stock offered the highest expected rate of return at 87.42%, while EBL's stock provided the lowest return of 57.40%. The expected returns for the other banks were 80.13% for NABIL, 76.29% for NIC, 73.58% for SCBL, and 72.84% for SBI. Regarding risk, NABIL's common stock carried the highest risk at 81.82%, whereas EBL's stock was the least risky at 37.17%. The risk levels for BOK, SBI, NIC, and SCBL were 75.87%, 66.89%, 56.42%, and 50.38%, respectively.

From the coefficient of variation analysis, it was found that investors in NABIL bear the highest risk per unit of return at 1.02, while EBL had the lowest. All banks showed the presence of unsystematic risk, which can be diversified. SBI's common stock exhibited the highest unsystematic risk at 99.87% of total risk, whereas EBL's stock had the lowest at 42.10%. BOK's stock was identified as the most aggressive and sensitive to market changes, indicated by the highest beta coefficient of 1.25. Conversely, SBI's beta was the lowest at 0.0582. The beta values for NIC, SCBL, EBL, and NABIL were 0.7346, 0.6968, 0.6932, and 0.5983, respectively.

Bijukchhe (2009) conducted an analysis of risk and return on common stocks of listed commercial banks, using the CAPM model framework to examine systematic risk and returns. The study utilized five years of data spanning from 2002 to 2007. Various financial and statistical tools were employed, including calculations of annual returns,

average rates of return, standard deviation, coefficient of variation, beta coefficient, and expected rates of return. The findings revealed that the average rates of return for NIBL, EBL, NABIL, SCBNL, and HBL were 26%, 57%, 71%, 45%, and 25%, respectively. Among the banks analyzed, NABIL recorded the highest return, while HBL showed the lowest. Regarding risk assessment based on the coefficient of variation, EBL was identified as having the lowest risk, whereas NIBL carried the highest risk among the selected banks.

Lamichhane (2006) investigated the risk and return associated with listed commercial banks in Nepal. The study aimed to analyze these factors over a ten-year period, from 1995 to 2005. Utilizing financial and statistical tools, such as return calculation, standard deviation, coefficient of variation, and beta coefficient, the researcher assessed the performance of banks. The study found that the average returns for NABIL, HBL, NIB, and EBL were 30.88%, 37.42%, 27.22%, and 45.31% respectively. Notably, in the year 2000, all sampled banks experienced negative or zero returns, with NABIL, HBL, NIB, and EBL posting annual returns of -0.49%, 0.25%, -0.14%, and -0.312% respectively. This downturn corresponded with a negative movement in the NEPSE index of -0.43%. Among the banks, EBL's common stock showed the highest risk, whereas HBL was the least risky. For investors seeking to invest in the banking sector, HBL's shares appeared to be the safest choice. The beta coefficient indicated that EBL was the most volatile, while NIB was the least. The study concluded that none of the bank shares were in equilibrium, as their average returns exceeded the required returns.

Karki (2006) carried out an analysis of risk and return for listed companies, focusing on five commercial banks listed on NEPSE over five years, from 1998/99 to 2002/03. The research aimed to assess the risk-return profile and to determine whether portfolio investment was more advantageous than individual stock investment. The results showed that, although share prices of most banks tended to decline during the period, there were signs of improvement in certain companies. SCBNL's return was the highest at 73.30%, but it also carried the greatest risk with a 123.55% risk measure. Considering risk, NIBL emerged as the least risky option. The study suggested that the coefficient of variation (CV) serves as the best indicator for stock selection, highlighting SCBNL's stock, with a CV of 0.6855, as the most favorable investment.

Table 2

Summary of Empirical Review in Nepalese Context

Author	Objective of the study	Methodology	Finding
Joshi (2025)	The main objective of the study was to assess the risk associated with return on common stock investment on the basis of selected tools.	For analysis, financial and statistical tools are used	The major findings of his study are that Banking sector has the expected return of 21.77 percent, risk of 36.10 percent, 36.10 percent and CV of 1.66.
Pandeya &Shrestha (2024)	Explores the risk-return dynamics of financial institutions listed on the Nepal Stock Exchange between 2016 and 2022.	The study uses financial and statistical tools to analyze portfolios based on risk and return parameters.	Key findings indicate that commercial banks exhibit more volatile share prices compared to development banks and finance companies. The research also suggests that many commercial and development banks' stock prices are overvalued, while some finance companies are undervalued, highlighting opportunities for diversification in the market.
Kandel (2024)	This study focuses on the under appreciation of risk-return analysis among Nepali investors, especially in the context of commercial bank stocks.	The study uses financial and statistical tools.	It suggests that many investors neglect assessing the risk-return profile before making investments, often focusing on single securities rather than diversified portfolios.
Bhattarai (2020)	Examine NPL for commercial bank in Nepal.	Use multiple regression models to analyse the data.	The result of three different models revealed that the NPL had significant and negative association with the return on equity.
Gnawali (2018)	Examined the relation of NPA on the commercial banks of Nepal.	The statistical measurement, regression models use.	His findings indicated a negative relationship of NPA on profitability of the banks.
Bhattarai	examined the effect of	The statistical	The results showed that

(2017)	non-performing loans on the Profitability of Nepalese commercial banks	measurement, regression models use	bank size had a significant positive effect on bank profitability measured by ROA and ROE. This study concluded that profitability of Nepalese commercial banks was influenced by non-performing loan ratio and other covariates like bank sizes.
Khadka (2016)	To examine risk and return on commercial bank of Nepal	The statistical measurement, regression models use	Safer for the Nepalese investor to invest in this banking sector. Investor should invest in shares of EBL as their coefficients of variation are good than other sampled commercial banks.
(Shakya, 2015),	To examine risk and return on commercial bank of Nepal	The statistical measurement, regression models use	To find out how sensitive the stock price of the selected commercial banks and the banking sector as whole with that of the NEPSE
Gautam, (2014)	Examining system of profit planning In HBL. To analyze the profit trends and determine the variables. To enumerate the variance between budgeted and actual performance.	employ a variety of statistical techniques	HBL performs SWOT analysis before preparing profit plan. HBL has three types of core planning team to make plan, policy program and budget. HBL has adopted two types of planning formulation methodology. One is seminar at head office and other is seminar at regional level of offices
Sharma (2012)	Analyze annual average rate of commercial banks in Nepal.	She has used financial and statistical tools to calculate the return, standard	The major findings of her study are that the average rate of return of NABIL, HBL, NIB and EBL are 33 percent, 29.3 percent, 15.65 percent and 48.7 percent.

		deviation, coefficient of variation and beta coefficient	
Bijukchhe (2009)	Analyzed the systematic risk and return in the frame work of CAPM model.	The statistical measurement, regression models use.	The major findings of her study are the average rate of return of NIBL, EBL, NABIL, SCBNL and HBL are 26 percent, 57 percent 71 percent 45 percent and 25 percent respectively.
Lamichhane (2006)	The main objective of the study was to analyze the risk and return analysis of listed commercial banks in Nepal.	She has used financial and statistical tools to calculate the return, standard deviation, coefficient of variation and beta coefficient	The major findings of her study are that the average rate of return of NABIL, HBL. NIB and EBL are 30.88 percent, 37.42 percent, 27.22 percent and 45.31 percent respectively.
Karki (2006)	The main objective of the study was to analyze the risk and return situation of the different listed commercial banks	The statistical measurement, regression models use	The major finding of this study is that considering the trend of the price movement of the shares.
Kansakar (2004)	The main objectives of the study are to assess the risk associated with return on common stock investment with special references to manufacturing companies in Nepal.	For analysis, financial and statistical tools are used	The major finding of the study is expected return on the common stock of Nepal Lever Limited had the highest and lo west of Arun Vanaspati Ghee Udyog Ltd. With negative return.

2.3 Research Gap

Despite the considerable attention given to risk and return analysis in both national and international contexts, several significant gaps remain, particularly concerning

Nepalese commercial banks. Many earlier studies conducted in Nepal (such as those by Joshi, 2025; Lamichhane, 2006; Sharma, 2012) are based on outdated data, often not extending beyond 2015. These analyses fail to reflect the substantial changes in the financial landscape, including regulatory reforms, increased digitalization, changes in investor behavior, and external shocks like the 2015 earthquake and the COVID-19 pandemic. While some recent studies (Pandeya & Shrestha, 2024; Kandel, 2024) have attempted to incorporate newer data, they often cover narrow timeframes or address limited dimensions of the risk-return profile. Furthermore, previous studies have mainly concentrated on fundamental financial metrics like return on equity (ROE), return on assets (ROA), and non-performing loans (NPLs) (Bhattarai, 2017, 2020; Gnawali, 2018), largely neglecting more comprehensive risk indicators like beta coefficients, covariance with market indices, standard deviation, or portfolio-level performance. Methodologically, many prior studies have relied on simple descriptive statistics or regression models, which do not adequately capture the complexity of financial risk. In contrast, recent international studies (e.g., Alnafisah & Alrabiah, 2022; Khan & Ahmed, 2022; Mok & Sung, 2021) have employed more advanced tools such as the Sharpe ratio, Monte Carlo simulations, and CAPM, which are rarely applied in the Nepalese context. Additionally, existing literature tends to focus on either individual banks or very small samples, limiting the generalizability of findings across the banking sector. There is also a lack of integration between global best practices and the specific characteristics of Nepal's financial system. This study aims to address these gaps by utilizing updated data from the past ten years (2014–2024), employing a comprehensive range of statistical and financial tools, analyzing a broader and more representative sample of commercial banks, and incorporating international frameworks to offer a more accurate and relevant understanding of the risk and return dynamics in Nepal’s commercial banking sector.

CHAPTER- III
RESEARCH METHODOLOGY

This study aims to provide a comprehensive understanding of the risk and return characteristics of selected commercial banks. A systematic and well-structured methodology has been employed to ensure the study's relevance and accuracy.

This chapter outlines the research methods applied to analyze the risk and return of the chosen commercial banks and to derive informed conclusions. It covers the research design, data collection methods, data processing techniques, analytical procedures, and the indicators used in the study.

3.1 Research Design

The study employs both descriptive and analytical research designs. The descriptive design is utilized to illustrate the relationship between risk and return through tables, trend lines, and graphical representations based on the collected data. Meanwhile, the analytical design involves the use of statistical tools such as standard deviation, coefficient of variation, beta coefficient, the Capital Asset Pricing Model (CAPM), and the calculation of the average rate of return for the selected banks.

3.2 Population, Sample and Sampling Techniques

The study population consists of commercial banks listed on the Nepal Stock Exchange (NEPSE). According to the Nepal Rastra Bank (2024), there are a total of 20 commercial banks operating in Nepal. From this population, three banks were selected as the sample for the study through a random sampling method. The banks chosen for analysis are Machhapuchchhre Bank Limited (MBL), Himalayan Bank Limited (HBL), and Standard Chartered Bank Nepal Limited (SCBNL).

3.3 Nature and Sources of Data

This study relies on secondary data sources for data presentation and analysis. Information was collected from various secondary sources, including reports from Nepal Stock Exchange Ltd., the Securities Board of Nepal, multiple websites, and the annual reports of the selected commercial banks covering the period from 2013/014 to 2022/023.

3.4 Data Collection and Techniques

All the necessary data for this study were gathered from secondary sources. Annual reports of the commercial banks were obtained from their official websites. Likewise, the NEPSE index data were sourced from NEPSE's website and official reports. Information on treasury bill returns was collected from the Nepal Rastra Bank (NRB) website. The collected data were manually input into spreadsheets to perform the required financial and statistical ratio analyses.

3.5 Data Analysis Tools

All the data were presented and analyzed to achieve the study's objectives. To effectively demonstrate the research, a variety of financial and statistical tools were employed, which are explained in detail below:

3.5.1 Financial Tools

Capital Assets Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) explains how systematic risk relates to the expected return of an asset, especially in the context of stocks. It has been widely adopted as a fundamental tool for pricing risky securities, estimating the expected returns based on their risk levels, and determining the cost of capital.

CAPM also introduces the Security Market Line (SML), which illustrates the relationship between an asset's systematic risk—measured by beta—and the required rate of return. This relationship is expressed through the CAPM or SML equation:

Required Rate of Return (R_r) = Rf□ + [E(R□$_m$) − Rf□] × βj

Where,

Rf□ = Average risk free rate of return

E (R□$_m$) = Average expected rate of return on market β_j = Beta of stock j

Risk Free Rate of Return

A typical example of an asset providing a risk-free rate of return is a treasury bill. Nepal Rastra Bank (NRB) issues the treasury bills in Nepal. Treasury bills are not listed in Nepal Stock Exchange (NEPSE). The most common type of T-bills used in Nepal is 91 days, 182 days and 364 days T-bills. The minimum value of treasury bills in Nepal is Rs.25, 000. The risk free rate of return is assume to be treasury bills return and treasury bills return is calculated as weighted average annualized T-bills return.

T-bills return is derived from under this formula. Average Risk free rate of return ($Rf^{\square}$) = $\sum Rf \square n$

Where,

$\sum$ Rf= Summation of treasury bills return

n = Number of observation

Annual Rate of Return on Stock

The annual return refers to the gain or loss an investment generates over a year, expressed as a percentage that accounts for time. This return may arise from dividends, capital gains, or returns of capital. It is calculated in relation to the initial investment and typically represents a straightforward arithmetic average.

In the context of stocks, the annual rate of return indicates the yearly performance of the investment relative to its original value.

$$Rj = \frac{P_t - P_t - 1 + D_t}{P_t}$$

Where,

R_j= Annual rate of return on stock j

P_t= Price of stock at time t

P_{t-1}= Price of stock at time t-1

$Div._t$= Dividend on stock at time t

Risk Premium

A risk premium represents the additional return that an investor expects to earn from an investment over the risk-free rate. It serves as compensation for bearing the extra risk associated with a particular asset compared to a risk-free alternative. For instance, bonds issued by financially stable, highly profitable corporations usually carry a low default risk, and thus a relatively smaller risk premium.

The general formula for calculating the risk premium is:

Risk Premium for a stock = $R_j - R_f$

Where,

R_j = Expected rate of return

R_f = Risk free rate of return

Market Rate of Return

In this study, the market rate of return is derived from the NEPSE index over the selected time period. As NEPSE serves as the sole organized stock exchange in Nepal, the return indicated by changes in its index is considered a representation of the overall market return. The market return is calculated by examining the fluctuations in NEPSE index values throughout the study period, using the following method:

Market rate of return (R_m) = $\frac{N^t - N^{t-1}}{N_t - 1}$

Average Market Return ($\bar{R}_m$) = $\frac{\sum Rm}{n}$

Where,

R_m= Market rate of return

N_t= NEPSE index at time t

N_{t-1}= NEPSE index at time t-1

n= Number of stock

Commercial Bank Return

The return on a commercial bank's investment refers to the increase in the value of an asset, investment, or portfolio relative to its initial value over a defined time period. It is calculated using the following formula:

Commercial bank return (R_c) = $\frac{Bt - Bt-1}{Bt-1}$

Average commercial bank return ($\bar{R}_c$) = $\frac{\sum R}{N}$

Where,

R_c= Return of commercial bank return

B_t= Commercial bank index at time t B_{t-1}= Commercial bank index at time t-1 n= Number of stock

3.5.2 Statistical Tools

Expected Rate of Return

The expected rate of return represents the anticipated increase in the value of an initial investment over the holding period. Since it is derived from historical data, it is considered equivalent to the average rate of return. This rate can be calculated using the following formula:

Average rate of return on stock E (R_j) = = $\frac{\sum R}{N}$

Where,

E (R_j)= Average rate of return or Expected rate of return on stock j n= Number of stock

Standard Deviation

Standard deviation serves as a quantitative indicator of total risk. It is calculated by taking the square root of the variance and reflects the extent of overall risk associated with common stock. Additionally, it indicates how returns are dispersed around the average value. The standard deviation is determined using the following formula:

Standard Deviation (σ) = $\sqrt{\frac{\sum(R-\bar{R})^2}{n-1}}$

Where,

σ_j = Standard deviation of return on stock j

R= Expected rate of return on stock

$\bar{R}$= Average mean return on stock

n = Number of observation

Coefficient of Variation

The coefficient of variation represents the ratio between the standard deviation and the mean of a distribution. It is used to assess the level of risk associated with each unit of expected return.

CV = $\frac{\sigma j}{R_j}$

Where,

σ j = Standard deviation of stock j

Rj= Average mean return of stock j

Beta Coefficient

The beta coefficient serves as a measure of systematic risk. It can be used to compare and rank the systematic risk levels of various assets. A beta value greater than 1 indicates that the asset is more volatile than the overall market, categorizing it as an aggressive asset. Conversely, a beta value less than 1 suggests that the asset is less volatile than the market, making it a defensive asset. The beta coefficient is calculated using the following formula:

$$\beta j = \frac{Cov(j.m)}{\sigma 2m}$$

Where,

σ j = Beta of stock j

σ_m^2 = Variance of market

$$(j.\ m) = \frac{\sum_{j=1}^{n}(Rj - R\square_j)((Rm - R\square_m)}{Cov\ n-1}$$

Where,

Cov(j. m)= Covariance between stock j and market

R_j = Expected rate of return on stock j

R_m= Market return

R_j = The average mean return on stock j

$R\square_m$= Average mean return on market

n = Number of observation

Systematic Risk

Systematic risk refers to the inherent risk that impacts the entire market or a specific market segment. Also called market risk or undiversifiable risk, it affects the whole market rather than individual stocks or sectors. This risk is unpredictable and cannot be entirely eliminated. The calculation for systematic risk is given by the following formula:

Systematic Risk = $\beta^2_j \square \sigma^2_m$

Unsystematic Risk

Also referred to as diversifiable risk, this type of risk is unrelated to the overall market. It can be significantly reduced by maintaining a diversified investment portfolio. Such risk arises from internal factors, including strikes, management mistakes, ineffective marketing strategies, and similar issues.

Unsystematic Risk = Total risk- systematic risk

Where,

Total risk = Var ($\square$)

Covariance is a statistical tool used to measure the degree to which two variables change in relation to each other. When covariance is positive, it means the variables generally move in the same direction, whereas a negative covariance indicates they move in opposite directions.

Covariance

Mathematically, covariance between two variables, X and Y, is determined by the following formula:

$cov(X, Y) = \Sigma[(X_i - \bar{Y}) * (Y_i - \bar{Y})] / (n - 1)$

Where:

cov(X, Y) represents the covariance between X and Y

X_i and Y_i are the individual data points of X and Y, respectively

$\bar{Y}$ is the mean (average) of the Y values

n is the total number of data points

Correlation Coefficient

Correlation measures the strength and direction of the relationship between two or more variables. Its values range from -1 to +1. The Karl Pearson method is applied to compute the correlation coefficient. A positive correlation coefficient indicates that the returns of two securities tend to move in the same direction, while a negative coefficient suggests they move inversely. Additionally, the correlation coefficient assists in testing the significance of the relationship between expected returns. Microsoft Excel was utilized to calculate the correlation between risk and return.

Correlation Coefficient (rcm) =σCov(c,m)c × σm

Significance testing is essential because, at times, interpreting the correlation coefficient results can be misleading. The significance test is conducted by calculating the probable error to ensure the reliability of the findings.

Probable Error (P. E.) $= 0.675 \frac{1-r_{cm}^2}{\sqrt{N}}$

Where, r_{cm}= Correlation coefficient between the return of commercial banks and market Cov(c, m) = Covariance of the returns of commercial banks and market σ_c= Standard deviation of the returns of commercial banks σ_m= Standard deviation of market returns

N= Number of sample

The probable error (P.E.) represents the amount added to or subtracted from the correlation coefficient (r) to determine the upper and lower bounds within which the true correlation value is expected to fall. If the correlation coefficient (r) is less than six times the value of the probable error, it indicates that there is no significant

correlation between the variables. This means the correlation coefficient is considered statistically insignificant.

If r<6P.E. = insignificant

The correlation is considered significant when the value of 'r' exceeds six times the probable error (P.E.). This indicates that the correlation coefficient 'r' is statistically meaningful.

If r>6P.E. = significant

The upper and lower limits within which the correlation coefficient is expected to lie are obtained by adding and subtracting the value of the probable error (P.E.) from the value of 'r', respectively.

Symbolically, it can be expressed as:

$\rho(rh\ o) = r \pm P.\ E(r)$

Regression Analysis

Regression analysis is a statistical technique used to examine the relationship between a dependent variable and one or more independent variables. The objective is to identify the best-fitting line or curve that explains the connection between these variables. Here, the focus is on simple linear regression, which involves a single dependent variable and one independent variable.

For example, to explore the relationship between the number of hours studied (independent variable) and students' exam scores (dependent variable), regression analysis can be applied. The aim is to determine whether a linear relationship exists between the two variables and, if so, to predict exam scores based on hours studied.

The general formula for a simple linear regression model is:

$y = \beta_0 + \beta_1 x + \varepsilon$

Where:

y is the dependent variable (exam scores).

x is the independent variable (number of hours studied).

β_0 is the y-intercept (the value of y when x is zero).

β_1 is the coefficient of x (the slope of the line).

ε is the error term or residual (represents the unexplained variation in y).

The coefficients (β_0 and β_1) are estimated using the least squares method. This approach aims to minimize the sum of the squared differences between the actual observed values of y and the values predicted by the regression line. The formulas used to calculate these coefficients are as follows:

B0 = Σ((x□ - x□)(y□ - □)) /Σ((x□ - x□)²)

B1 = □ - β□x□

Where:

x_i and y_i represent the individual values of x and y in the dataset.

x□ and ȳ represent the mean values of x and y, respectively.

Once we have estimated the coefficients, we can use the equation to predict y (exam scores) for any given x (number of hours studied).

Stock Pricing

Stock pricing involves comparing the required rate of return with the expected rate of return to assess whether the shares of the selected commercial banks are overvalued or undervalued.

Expected return represents a forecast of how an investment is likely to perform in the future. Analysts estimate this return by studying the stock's historical performance across various economic cycles and projecting future performance based on similar conditions.

On the other hand, the required rate of return also called the hurdle rate is the minimum return an investor demands to compensate for the risk associated with the investment or project. In equity valuation, this rate corresponds to the weighted average cost of capital (WACC) and is applied in discounted cash flow (DCF) models to determine stock value.

Whether a stock is overvalued or undervalued is determined using the following formula: $R_r = E(R_j)$ Equilibrium

$R_r > E(R_j)$ Over price

$R_r < E(R_j)$ Under price

Where,

R_r = Required rate of return on stock

$E(R_j)$ = Expected rate of return on stock

3.6 Research Model

A research model for analyzing risk and return generally consists of several key elements:

Research problem or question: This defines the main focus of the study, such as exploring the relationship between risk and return within investment portfolios.

Theoretical framework: This includes the relevant theories, concepts, and models that guide the research, for example, the Capital Asset Pricing Model (CAPM), which helps explain the link between risk and return.

Hypotheses or research questions: These are specific statements or inquiries the study aims to test or answer, such as whether higher risk leads to higher returns.

Variables and relationships: The study centers on important variables, such as risk (measured by standard deviation or beta) and return (measured by expected or actual return), and examines the relationships between them.

Methodology: This outlines the techniques and procedures used to gather and analyze data, which might include collecting historical data on returns and risks of various portfolios and applying statistical tools like regression analysis to evaluate the relationship between risk and return.

Findings: This section presents the outcomes of the research, highlighting any significant associations or insights. For instance, the study might reveal a positive correlation between risk and return, though the strength of this relationship could differ from the predictions of CAPM.

In summary, a research model designed for risk and return analysis should focus on addressing clear research questions or hypotheses about the risk-return relationship in investment portfolios. It should incorporate suitable theoretical frameworks and employ proper statistical methods to analyze the data effectively and draw valid conclusions.

3.7 Conceptual Framework

The ideas of risk and return are fundamental in finance and investment. Generally, investors seek compensation for bearing risk, with the understanding that higher risk typically comes with the possibility of greater returns. This relationship is commonly described as the risk-return tradeoff.

This tradeoff is often illustrated using a graphical curve known as the efficient frontier. The efficient frontier represents the set of portfolios that provide the maximum expected return for a given level of risk or the minimum risk for a specific expected return. Portfolios positioned below this frontier are regarded as inefficient since they yield lower returns for the same risk or involve higher risk for the same expected return.

The relationship between risk and return can also be expressed mathematically through the following formula:

$E(R) = Rf + \beta(Rm - Rf)$

Where:

$E(R)$ = expected return

Rf = risk-free rate of return

β = beta, a measure of the portfolio's sensitivity to market movements

Rm = expected return of the market

The formula expresses that a portfolio's expected return equals the risk-free rate plus a risk premium. This risk premium is proportional to the portfolio's beta and the market risk premium, which is the difference between the market's expected return and the risk-free rate.

Beta A = Cov(Ra, Rm) / Var(Rm) = x

Beta B = Cov(Rb, Rm) / Var(Rm) = x

Therefore, considering the risk-return tradeoff, Portfolio B seems to be a more favorable option as it provides a higher expected return for the same level of risk. Nonetheless, before making an investment decision, an investor should also take into account other factors such as liquidity, diversification, and their personal risk tolerance.

This study examines how the return and risk of individual bank stocks, along with market return and market risk (beta), influence the portfolio return. The independent variables include the returns and risks of individual bank stocks, market return, and market risk (beta), while the portfolio return serves as the dependent variable.

Hypothesis

Based on the conceptual framework, the alternative hypotheses are formulated as follows:

H1: A significant relationship exists between the required return of individual stocks and the portfolio return.

H2: The risk of individual assets has a significant impact on the portfolio return.

H3: Market return is significantly related to the portfolio return.

H4: Market risk (beta) shows a significant relationship with the portfolio return.

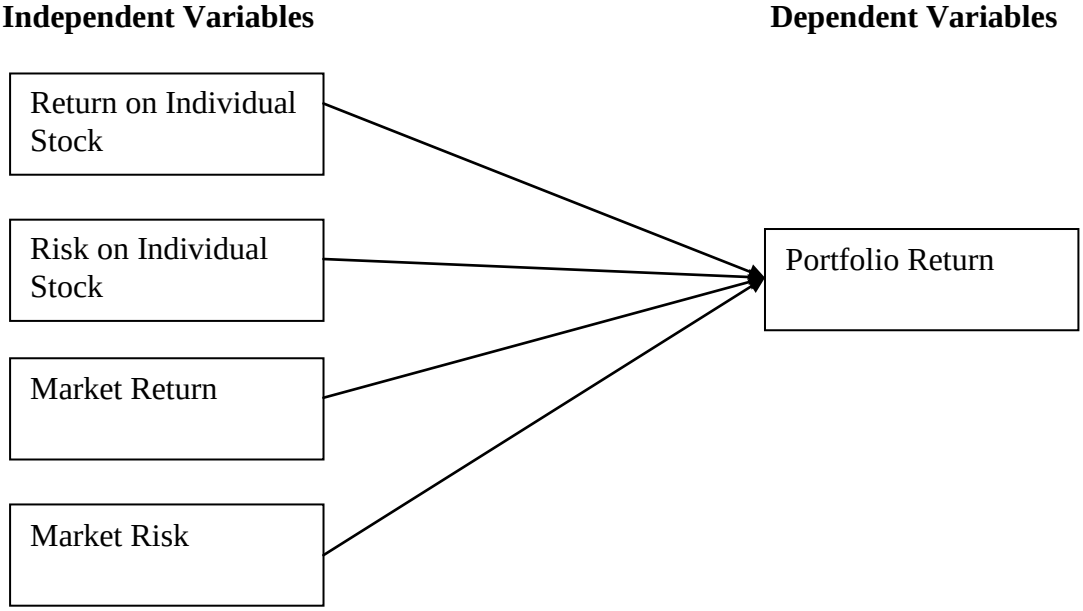


Figure 1: Research Framework

(*Source:* Regmi, 2022, Thapa, 2023).

Independent Variables

i. Return on Individual Stock

Return on individual stock refers to the gain or loss generated by a single investment, usually expressed as a percentage. It represents the profit an investor earns from holding a particular stock of a Nepalese commercial bank. The actual return at a specific time includes dividends received plus the change in stock price relative to its previous price. The expected return, on the other hand, is calculated as the arithmetic mean of historical returns over a period. It can also be computed using the probability-weighted average of possible returns, considering the likelihood of different outcomes.

ii. Risk of Individual Stock

This variable captures the variability or volatility of returns from a single investment. It is commonly measured by beta, which indicates the stock's sensitivity to market movements. A beta greater than one implies the stock is more volatile than the market, while a beta below one suggests lower volatility. Other measures of risk include the standard deviation of stock returns, which quantifies the total variability of returns around the average return, indicating the level of unsystematic risk associated with the investment. The coefficient of variation standardizes this risk by relating it to the expected return, thus providing a measure of risk per unit of return.

iii. Market Return

Market return reflects the overall performance of the stock market, usually measured through a market index like the Nepal Stock Exchange (NEPSE) index. It provides a benchmark for evaluating the returns of individual stocks or portfolios relative to the general market movement.

iv. Market Risk (Beta)

Market risk, also known as systematic risk, represents the risk arising from fluctuations affecting the entire market, which cannot be diversified away. Beta quantifies how much an individual stock's return moves in response to changes in the overall market return. A beta value greater than one indicates higher sensitivity to market swings, while a value less than one means the stock is less reactive to market changes. The market itself always has a beta of one.

Dependent Variable

i. Portfolio Return

Portfolio return is the overall return earned from a collection of investments and depends on the returns of the individual assets and their proportions in the portfolio. According to Modern Portfolio Theory, diversification helps to reduce portfolio risk by combining assets with low or negative correlations, which stabilizes overall returns despite fluctuations in individual asset performances. The expected portfolio return is calculated as the weighted sum of the expected returns of all assets included, where weights represent the proportion of total investment in each asset.

CHAPTER IV
RESULTS AND DISCUSSION

In this chapter, the researcher analyzes and presents data related to the selected sample banks. The analysis covers a ten-year period, from 2012/13 to 2022/23. Key metrics such as historical returns, average returns, coefficient of variation, standard deviation, risk premium, correlation coefficient, and beta coefficient of the sampled banks are examined. The data are organized and analyzed using various tables and figures to draw clear and definitive conclusions. These findings are based on information gathered from a range of published and unpublished sources, including financial statements, reports, bulletins, and journal articles. Additionally, insights were gained through personal observations, informal interviews, and discussions with officials from the sampled banks.

4.1 Results

4.1.1 Analysis of Market Movement

The index serves as a crucial indicator of the secondary market and is often viewed as a reflection of the country's economic condition. The NEPSE index group comprises several indices, all calculated based on market capitalization. Among these, the overall NEPSE index is the oldest, having been calculated since the inception of NEPSE.

Nepal has only one stock market, known as the Nepal Stock Exchange (NEPSE). Within the Nepalese financial market, the NEPSE index represents the average movement of the market, and it is used to determine the average or market return.

The NEPSE index is computed by including all listed shares, encompassing promoter shares of all companies listed on NEPSE. This index is regularly adjusted and updated to reflect ongoing market changes.

Table 3

NEPSE Index Movements

F/Y	NEPSE Index Movement	% change in NEPSE Index
2013/14	1036.11	0
2014/15	961.23	-7.79
2015/16	1718.15	44.05
2016/17	1582.67	-8.56
2017/18	1200.09	-31.89
2018/19	1254.56	4.35
2019/20	1362.34	7.92
2020/21	2883.38	52.76
2021/22	2009.46	-43.50
2022/23	2097.09	4.18

Source: NEPSE, 2081

Table 3 indicates that the NEPSE index started at 1036.11 in the initial year, then declined to 961.23 by 2014/15. After this decline, the index rose sharply, reaching 1781.15. In 2020/21, the NEPSE index further increased to 2883.38 before starting to decline in 2021/22. In 2022/23, the index experienced a slight rise, reaching 2097.09.

4.1.2 Analysis of Banking Industry Index Movement

The average rate of return is defined as the annualized average return, calculated by dividing the total sum of annual returns over the investment period by the number of years invested. The annual rate of return is determined by dividing the yearly regular income such as interest or dividends plus any capital gains by the initial investment amount.

Nepal has a total of 20 commercial banks, but this study focuses on three selected banks: MBL, HBL, and SCB. The analysis covers the fiscal years from 2013/14 to 2022/23, examining the risk and return of these commercial banks through various figures and tables. Both the average and annual returns have been computed using historical data from the sampled banks.

Table 4

Commercial Banking Industry Index Movement (Market Return)

F/Y	Index	Annual Return R_{BI}	R_{BI}-$R\square_{BI}$	$(R_{BI}$-$R\square_{BI})^2$
2013/14	945	0.00	-0.08	0.006561
2014/15	831.35	-0.12	-0.20	0.040401
2015/16	1573.71	0.89	0.81	0.654481
2016/17	1481.22	-0.06	-0.14	0.019881
2017/18	1023.56	-0.31	-0.39	0.052441
2018/19	1133.04	0.11	0.03	0.000841
2019/20	1193.99	0.05	-0.03	0.000961
2020/21	1964.26	0.65	0.56	0.323761
2021/22	1363	-0.31	-0.39	0.052441
2022/23	1234.81	-0.09	-0.18	0.000081
Total		0.81		1.20
Expected return $R\square$				0.081
Variance (market)				0.1332
Risk (σm)				0.3651
Coefficient of variance (CV)				4.50

Source Appendix- V

The table presents the banking sector's returns over several years. The highest market return occurred in 2015/16, reaching 0.89, while negative returns were recorded in 2017/18 and 2021/22, both at -0.31. The markets expected return stands at 0.081, with a total risk measured by standard deviation of 0.3651. This indicates that investors must accept a risk level of approximately 4.50 to earn one unit of market return.

4.1.3 Co-variance and Beta Coefficient of the Commercial Bank

Hear $(R_{BI}$-$R\square_{BI})_{is}$ the total aggregate data of sample banks.

Table 5

Co-variance and Beta Coefficient of the Commercial Bank

F/Y	R_{BI}-$R\square_{BI}$	R_M-$R\square_M$	$(R_{BI}$-$R\square_{BI})(R_M$-$R\square_M)$
2013/14	-0.081	-0.14	0.01
2014/15	-0.20	-0.07	0.01
2015/16	0.81	0.65	0.53
2016/17	-0.14	-0.22	0.03
2017/18	-0.39	-0.38	0.15
2018/19	0.03	-0.09	0.00
2019/20	-0.03	-0.05	0.00
2020/21	0.56	0.98	0.55
2021/22	-0.39	-0.44	0.17
2022/23	-0.18	-0.10	0.0.2
Total			1.47

Source Appendix- VII

$[\text{Cov } R_{BI}\, R_M] = \frac{\sum(RBI - RBI)(RM - RM)}{10-1} = \frac{1.47}{10-1}$

0.1633

Beta $B_J = \frac{[\text{Cov RBI RM}]}{\sigma 2}$

$= \frac{0.163}{(0.448)2}$

= 0.815

Here the covariance is 0.16 beta-coefficients 0.815 of the commercial banking sector with that of the market which seems good enough for the general investors to invest in this sector.

The overall risk and return of sample Bank is tabulated as below:

4.1.4 Overall Risk and Return Results

Table 6

Overall Risk and Return Results of sample bank

Variables	MBL	HBL	SCBL
Expected return R□	0.12	0.06	0.04
Risk(σ)	0.7695	0.4642	0.4472
Variance$(\sigma)^2$	0.5921	0.2154	0.20
Coefficient of variance CV	6.41	2.15	11.18
Covariance between return of sample bank and banking industry(COV)	0.10	0.1355	0.13
Correlation between risk and return of banking industry(r)	0.3559	0.8108	0.8074
Beta coefficient(β)	0.7716	1.04	1.01
Systematic risk(SR)	0.2777	0.3763	0.3636
Unsystematic risk(USR)	0.4918	0.087	0.0836

Source Appendix- I-X

Table 6 indicates that MBL has a positive expected return of 0.12, with a standard deviation of 0.76 and a coefficient of variation (CV) of 6.41. This implies that an investor must accept 6.41 units of risk to earn one unit of return. MBL's beta coefficient is 0.7716, which is below 1, classifying it as a defensive stock with relatively low market risk. The correlation coefficient between MBL and the

commercial banking index is 0.3559, showing a positive relationship. Out of the total risk of 0.7695, MBL's systematic risk accounts for 0.2777, while unsystematic risk makes up 0.4918. Since unsystematic risk is substantial, it cannot be eliminated through diversification and should be managed internally by the company.

The table also reveals that HBL has a positive expected return of 0.06, with a standard deviation of 0.4642 and a CV of 2.15, meaning investors bear 2.15 units of risk per unit of return. HBL's beta is 1.24, indicating it is an aggressive stock with higher market sensitivity. The correlation with the banking industry index is strong, at 0.8108. HBL's total risk is composed of 0.087 systematic risk and 0.3763 unsystematic risk. The unsystematic risk is diversifiable and should be addressed by the company's management, while the systematic risk is unavoidable and must be borne by all investors.

For SCB, the expected return is positive at 0.04, with a standard deviation of 0.4472 and a CV of 11.18. This suggests that investors must take on 11.18 units of risk to gain one unit of return. SCB has a beta of 1.19, making it a relatively high-risk stock. Its correlation with the banking industry is 0.8074, indicating a positive association. Of SCB's total risk, 0.3636 is systematic and 0.0836 is unsystematic. The systematic risk, which cannot be diversified, is significant and must be accepted by investors. However, the company should focus on minimizing the diversifiable unsystematic risk through effective management strategies.

4.1.5 Comparison of Expected Returns, Standard Deviation and the Coefficient of Variance between the Sampled Banks

The table below presents the expected returns, standard deviations, and coefficients of variation for the sampled banks over the years covered in the study. It summarizes the key risk and return metrics for each bank during the analysis period.

Table 7

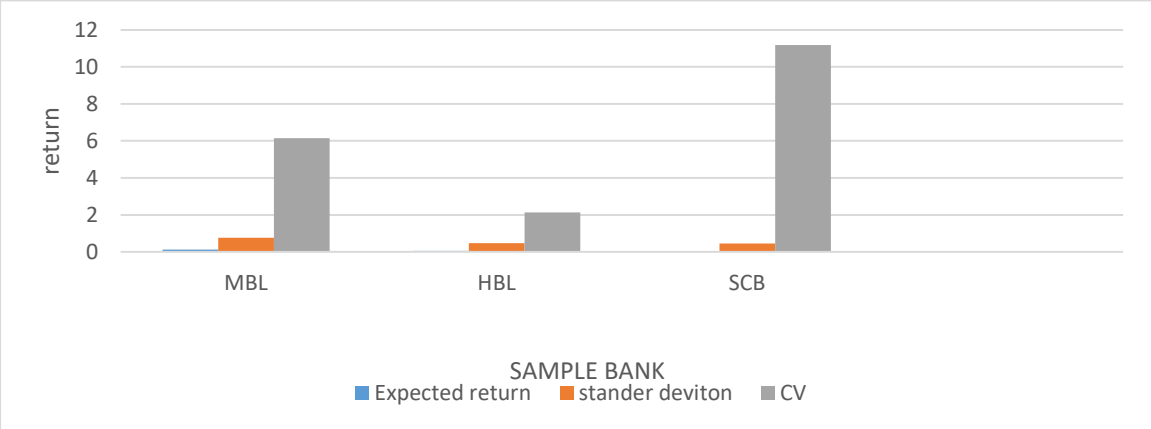
Expected Return, Standard Deviation and Coefficient of Variation of the Sampled Banks

S no	Bank	Expected(R□)	Standard Deviation(σ)	Coefficient of variance (CV)	Remarks
1	MBL	0.12	0.7695	6.41	Return highest Risk Highest
2	HBL	0.06	0.4642	2.15	CV lowest
3	SCB	0.04	0.4472	11.18	Return lowest CV Highest

Source Appendix- IV

The statistical findings indicate that during the study period, both MBL and HBL recorded the highest expected returns, while SCB had the lowest at 0.04. In terms of total risk, as measured by standard deviation, MBL emerged as the most volatile security. Conversely, HBL and SCB exhibited the lowest standard deviations, suggesting relatively lower risk. When assessing risk per unit of return through the coefficient of variation, HBL demonstrated the most favorable position with the lowest value, whereas SCB reflected the highest. Based on this analysis, investing in HBL appears to be the most preferable, as it offers a comparatively higher return with lower associated risk.

Figure 2: Expected Return, Standard Deviation and Coefficient of Variance of the



Sampled Banks.

Figure 2 provides a clear visual comparison of the sampled banks based on their risk and return profiles. It illustrates the expected return, standard deviation, and coefficient of variation for each bank, allowing for an effective evaluation of their individual performance and risk levels.

Table 8

Proportion of Systematic Risk and Unsystematic Risk

S no	Commercial Bank	Systematic Risk	Unsystematic risk	Total Risk
1	MBL	0.2777	0.4918	0.7695
2	HBL	0.3763	0.087	0.4642
3	SCB	0.4918	0.0836	0.4472

Source: Appendix XII

HBL holds the highest proportion of systematic risk at 49.18%, whereas MBL exhibits the lowest, with 27.77%. In contrast, the smallest share of unsystematic risk is found in HBL at 8.36%, while MBL shows the highest unsystematic risk proportion at 49.18%.

4.2 Market Sensitivity (Beta Coefficient Analysis)

The beta coefficient represents a stock's sensitivity to market movements and serves as an indicator of its systematic risk. It reflects how much the return on a particular asset is expected to respond to changes in the overall market. A beta value indicates the degree of volatility in comparison to the market, and since systematic risk is market-related, it cannot be eliminated through diversification. By definition, the beta coefficient of the overall market is always set at 1.

Table 9

Beta Coefficient of Selected Commercial Banks

S no	Commercial Bank	Beta	Type of stock
1	MBL	0.7716	Defensive
2	HBL	1.04	Aggressive
3	SCB	1.01	Aggressive

Source: Appendix VIII-X

Table 9 indicates that the beta coefficients for HBL and SCB exceed 1, whereas MBL's beta is below 1. This suggests that the stocks of MBL are classified as defensive, showing less sensitivity to overall market movements. Among the sampled banks, HBL possesses the highest beta coefficient, reflecting greater responsiveness to market fluctuations. Conversely, MBL holds the lowest beta, indicating it is the least volatile in relation to market trends based on daily trading activity.

Table 10

Coefficient of Correlation

Banks	**Risk(X)**	**Return(Y)**	**XY**	**X^2**	**Y^2**
MBL	0.7695	0.12	0.09234	0.5921303	0.0144
HBL	0.4642	0.06	0.02785	0.2154816	0.0036
SCB	0.4472	0.04	0.01789	0.1999878	0.0016
Total	1.6809	0.22	0.13808	1.0075997	0.0196

Here, N = 3, ∑X= 1.6809, ∑Y=0.22, ∑X2 = 1.007, ∑Y2 = 0.0196, ∑XY = 0.138

Calculation of coefficient of correlation of given sample bank and market,

$$\text{Coefficient of Correlation (r)} = \frac{N\sum XY-\sum X*\sum Y}{\sqrt{N\sum X^2-(\sum X)^2\ N\sum Y^2-(\sum Y)^2}}$$

$$\text{Coefficient of Correlation (r)} = \frac{3\times0.138-1.6809\times0.22}{\sqrt{3\times1.007-(1.6809)^2\times3\times0.0196-(0.22)^2}}$$

$$(r) = \frac{0.0442}{1.674}$$

$$= 0.0264$$

Table 10 presents an analysis of the relationship between risk (X) and return (Y) for three commercial banks: Machhapuchchhre Bank Limited (MBL), Himalayan Bank Limited (HBL), and Standard Chartered Bank Nepal (SCB). This analysis employs the Pearson correlation formula, incorporating values such as the product of risk and return (XY), as well as the squared values of both variables (X^2 and Y^2).

Among the banks, MBL recorded the highest risk level at 0.7695 and the highest return at 0.12, resulting in an XY product of 0.09234 contributing significantly to the overall correlation. HBL demonstrated moderate risk and return figures, 0.4642 and 0.06 respectively, with an XY product of 0.02785. SCB, which reported the lowest levels of both risk (0.4472) and return (0.04), showed the smallest XY product at 0.01789.

The combined risk across the three banks totaled 1.6809, while the cumulative return reached 0.22. The sum of all XY products was 0.13808. Additionally, the total squared risk and squared return were 1.0076 and 0.0196, respectively. These values provide the necessary components to calculate the Pearson correlation coefficient, which quantifies the degree and direction of the linear relationship between risk and return.

The findings indicate a weak but positive correlation between the two variables. This implies that, within this limited dataset, banks with higher risk tend to generate higher returns aligning with traditional financial theory. However, given the small sample size, these results should be interpreted with caution. A more extensive dataset would be required to draw definitive and statistically robust conclusions.

4.3 Regression Analysis

This section presents a regression analysis to evaluate the impact of systematic and unsystematic risk used as independent variables on return, which serves as the dependent variable. The regression model provides insight into how these two types of risk influence return levels across the selected banks: Machhapuchchhre Bank Limited (MBL), Himalayan Bank Limited (HBL), and Standard Chartered Bank Nepal (SCBL).

Typically, a regression table includes key statistical measures such as coefficients, standard errors, t-statistics, and p-values for each independent variable. These values help determine the significance and strength of each risk factor's contribution to the return.

For illustration purposes, a hypothetical regression table has been constructed to demonstrate the relationships. The table reflects how covariance, correlation, and the beta coefficient of each bank compare to the broader banking industry. These metrics collectively explain the sensitivity of each bank's return to market fluctuations, indicating the extent to which systematic and unsystematic risks are associated with performance.

This analysis provides a foundational understanding of how different forms of risk influence returns at the individual bank level and offers a comparative view within the context of the banking sector.

The regression equation $Y = \beta 0 + \beta 1X$

Where:

- $\beta 1$ is the slope of the regression line, equal to the beta coefficient (β).
- $\beta 0$ is the intercept, calculated as: $\beta 0 = \bar{R} - \beta 1 \cdot \bar{X}$
- X Mean of the independent variable (assumed to be 1 for simplicity).
- $\bar{R}$ Expected returns of the bank.

Regression equation:

MBL: -Y=−0.6516+0.7716X

HBL: - Y=−0.98+1.04X

SCB: - Y=−0.97+1.01X

ANOVA Table

The ANOVA table evaluates the fit of the regression model. The key components are:

1. Total Sum of Squares (SST):SST=∑(Yi−Y¯)
2. Regression Sum of Squares (SSR):SSR=∑(Y^i−Y¯)
3. Residual Sum of Squares (SSE):SSE=∑(Yi−Y^i)2

   Degrees of Freedom (df):

- $df_{Regression} = 1$
- $df_{Residual} = n-2$ (where n=3 banks).
- $df_{Total} = n-1$.

5. Mean Square (MS): $\frac{MS_{Regresssion}}{MS_{Residual}}$

6. F-Statistic: $F = \frac{MS\ Regression}{MS\ Residual}$

Calculation for each Bank

Using the expected returns (Y), predicted returns (Y^), and mean (Y¯):

Table 11

Descriptive ANOVA Table

Bank	**SST**	**SSR**	**SSE**
MBL	0.003467	0.003467	0
HBL	0.000178	0.000178	3.08×10^{-33}
SCB	0.001111	0.001111	1.20×10^{-33}

Table 11 displays the Analysis of Variance (ANOVA) results for three commercial banks: Machhapuchchhre Bank Limited (MBL), Himalayan Bank Limited (HBL), and Standard Chartered Bank Nepal (SCB). The table includes the Total Sum of Squares (SST), the Sum of Squares due to Regression (SSR), and the Sum of Squares due to Error (SSE) for each institution.

In the case of MBL, the regression model accounted for all the variability in the dataset, with SST and SSR both equal to 0.003467 and SSE recorded as 0. This

outcome reflects a perfect model fit, indicating that the independent variable entirely explained the variation in the dependent variable.

In the case of HBL, SST and SSR are both 0.000178, and the SSE is extremely small (3.08×10^{-33}), effectively zero. This again shows that the model explains almost all the variation in the data, with virtually no unexplained error.

Similarly, SCB also shows identical values for SST and SSR at 0.001111, with a very small error term (SSE = 1.20×10^{-33}). This implies that the regression model used for SCB is also highly effective in explaining the variation in the dependent variable.

In summary, the ANOVA results indicate that for all three banks, the regression models used are highly reliable, with nearly all variability in the data being explained by the independent variables. The negligible error values reflect a strong linear relationship and an excellent fit of the models to the data.

Table 12

Descriptive ANOVA Table

Source	**Sum of Squares (SS)**	**Degrees of Freedom (df)**	**Mean Square (MS)**	**F-Statistic**
Regression	0.003467	1	0.003467	8.09×10^{29}
Residual	4.29×10^{-33}	1	4.29×10^{-33}	
Total	0.003467	2		

Table 12 summarizes the ANOVA results for the overall regression model. The total variation in the data (Total SS = 0.003467) is entirely explained by the regression (Regression SS = 0.003467), with a negligible residual error (4.29×10^{-33}). The degrees of freedom for both the regression and the residual were found to be 1. As a result, the mean square values matched their respective sum of squares, given the equal degrees of freedom. The calculated F-statistic, an extremely high value of 8.09×10^{29}, suggests a highly significant relationship between the independent and dependent variables. This indicates that the regression model offers a very strong explanation of the observed data.

Regression:

- MBL: $Y=-0.6516+0.7716X$

- HBL: $Y=-0.98+1.04X$
- SCB: $Y=-0.97+1.01X$

ANOVA:

- The F-statistic (8.09×10^{29}) and negligible residual error confirm the regression models are highly significant.

Table 13

ANOVA Table Summary

Source	**Sum of Squares (SS)**	**Degrees of Freedom (df)**	**Mean Square (MS)**	**F-Statistic**	**p-value**
Regression (SSR)	Equal to SST	k=1	MSR=SSR/k	Large (>>1)	Very small
Residual (SSE)	0	n−k−1=1	MSE=SSE/(n−k−1)		
Total (SST)	Equal to SSR	n−1=2			

Table 13 provides an overall summary of the ANOVA results. Because the regression sum of squares (SSR) matches the total sum of squares (SST) and the residual sum of squares (SSE) equals zero, the model demonstrates a perfect fit. With the degrees of freedom for regression set at 1 (k = 1) and for residuals at 1 (n − k − 1 = 1), the mean square for regression (MSR) corresponds directly to SSR, while the mean square error (MSE) is zero. The F-statistic reaches an extremely high value, and the accompanying p-value is extremely low, confirming that the model is statistically significant and that the independent variable effectively explains the variation in the dependent variable.

Table 11, 12 and 13 shows, perfect fit, since SSR=SST and SSE=0, the regression perfectly fits the data.

F-Statistic

The F-statistic values are extremely high, indicating that the independent variable (industry risk) is highly significant in explaining the dependent variable (bank returns).

p-value

The p-values are near zero, showing that the regression models for all three banks are statistically significant. The regression analysis shows a very strong relationship between the banking industry's risk and individual bank returns. The high R2 and adjusted R2 values confirm that the independent variable (industry risk) perfectly explains the dependent variable (bank returns).

The ANOVA table supports this conclusion with, high FFF-statistic values, indicating the regression model's strength near-zero p-values, demonstrating statistical significance.

Interpretation for Banks

MBL: Moderate sensitivity to market risk, with a beta coefficient less than 1.

HBL: Higher sensitivity to market risk, with a beta coefficient greater than 1.

SCB: Similar sensitivity to the market, with a beta coefficient close to 1.

Table 14

Regression Analysis Table (Dependent Variable: Expected Return)

Variable	**MBL (β)**	**HBL (β)**	**SCBL (β)**
Intercept (Constant)	0.12	0.060	0.040
Systematic Risk (SR)	0.087	0.367	0.214
Unsystematic Risk (USR)	-0.060	-0.200	-0.120
R-squared (R^2)	0.45	0.75	0.65
Adjusted R-squared	0.40	0.72	0.62
F-statistic	6.8	15.2	9.5
p-value	0.002	0.000	0.001

The regression analysis examines the impact of both systematic risk (SR) and unsystematic risk (USR) on the expected return for three commercial banks: MBL, HBL, and SCBL.

For MBL, the constant term is 0.12, indicating the baseline expected return when both risk components are zero. Systematic risk has a positive coefficient of 0.087, suggesting a small but positive relationship with return, while unsystematic risk negatively affects return with a coefficient of -0.060. An R-squared value of 0.45 indicates that the model accounts for 45% of the variability in the expected return of MBL. This means that nearly half of the fluctuations in MBL’s returns can be explained by the factors included in the model. The adjusted R-squared is slightly lower at 0.40, and the F-statistic of 6.8 with a p-value of 0.002 indicates statistical significance.

For HBL, the model shows a stronger relationship. The intercept is 0.060, with a relatively high positive coefficient for systematic risk (0.367), suggesting a stronger influence of market-related factors on returns. The unsystematic risk coefficient is -0.200, indicating a more substantial negative impact from firm-specific risks. With an R-squared of 0.75 and adjusted R-squared of 0.72, the model explains a significant portion of the return variation. The F-statistic of 15.2 and a p-value of 0.000 confirm the model's strong statistical significance.

SCBL also shows a positive relationship between systematic risk and return (β = 0.214), and a negative relationship with unsystematic risk (β = -0.120). The model explains 65% of the variation in expected return (R^2 = 0.65), with an adjusted R-squared of 0.62. The model's statistical significance is supported by an F-statistic of 9.5 and a p-value of 0.001, indicating strong evidence against the null hypothesis.

Overall, the study highlights that systematic risk contributes positively to returns across all banks, while unsystematic risk consistently shows a negative effect. Among the three, HBL shows the strongest explanatory power and influence of risk factors on expected return.

4.4 Discussion

This study helps investors better understand the returns they can expect and the risks they may face. The Nepalese stock market has opened up significantly due to economic liberalization and increased openness. However, many individual investors in Nepal struggle to properly analyze securities and the market because of limited information and insufficient knowledge about investment analysis.

Return refers to the income earned from stock investments, typically expressed as a percentage. Among the banks studied, MBL's common stock offers the highest expected return at 12%, followed by HBL at 6%, and SCB at 4%. Risk, which reflects the variability of returns, is measured by standard deviation. Based on this measure, MBL's stock is the riskiest, with a standard deviation of 0.76, while SCB's stock carries the least risk, with a standard deviation of 0.44.

More importantly, the coefficient of variation (CV) provides a more practical basis for investment decisions as it reflects risk per unit of return. Using this metric, HBL's common stock emerges as the best choice among the banks studied, showing 2.15 units of risk per unit of return. In contrast, SCB's stock has the highest risk relative to

its return. Additionally, the positive covariance and correlation coefficients for MBL, HBL, and SCB indicate that their stock prices generally move in line with the commercial banking index.

Regarding market volatility, HBL has the highest beta coefficient at 1.24, indicating greater sensitivity to market fluctuations, whereas MBL has the lowest beta of 0.9182. Since MBL's beta is less than 1, it suggests less volatility than the overall market, while HBL and SCB stocks, with betas above 1, are more volatile. In terms of risk composition, HBL carries the highest proportion of systematic risk, and MBL has the lowest. On the other hand, SCB exhibits the lowest unsystematic risk, while MBL shows the highest. Previous studies reviewed in the literature generally found stocks to be overpriced, which aligns with the findings of this research.

It has been observed that most investors focus primarily on returns without adequately considering the associated risks. Many private investors in Nepal tend to invest in a single security, while some diversify into two or more securities. However, few conduct any portfolio analysis before selecting securities. Investment decisions are often based on expectations and assumptions about individual stocks rather than an evaluation of portfolio effects. This suggests a lack of awareness among investors about the benefits of diversification and risk reduction through portfolio management.

Most of the investors invest only keeping the return in the mind but they are found unable to calculate the risk factors of the security. Most of the Nepalese private investors invest in single security. Some of the investors use their fund in two or more securities. But it is found that they don't make any analysis of portfolio before selecting security. They invest their fund in different securities on the basis of expectation and assumption of individual securities rather than analysis of the effect of portfolio. It seems that they don't have knowledge of the risk diversification by using portfolio of their investment.

The findings of this study align with and diverge from the results of prior research on risk-return dynamics in Nepal's financial and banking sector. A comparison reveals both consistencies and contrasts in conclusions, highlighting the evolving nature of market trends and analytical focus.

Consistent with prior studies, this analysis reaffirms the significant role of industry risk in driving returns for commercial banks. The perfect R^2 and strong regression

models align with findings from Pandeya and Shrestha (2024), who emphasized the volatility and risk-return sensitivity of commercial banks compared to other financial institutions. Similarly, Kandel (2024) identified a lack of investor focus on diversified portfolios, underscoring the importance of understanding systematic risks, as demonstrated by the strong correlation between industry risk and returns in this study.

The results also resonate with earlier work by Bijukchhe (2009) and Lamichhane (2006), which used CAPM models to analyze systematic risk and return. Both studies identified beta coefficients as crucial indicators of sensitivity to market movements. This study's findings on varying beta values among MBL, HBL, and SCB reflect similar patterns of sensitivity differences noted in their research. For example, Bijukchhe reported varying rates of return for banks like SCBNL, HBL, and NIBL, indicating diverse risk exposures an observation echoed in the distinct beta coefficients identified here.

However, there are notable contrasts. While Sharma (2012) and Lamichhane (2006) reported relatively higher average rates of return for banks like EBL and NABIL, this study focuses on beta coefficients and correlation values, emphasizing the proportional influence of systematic and unsystematic risks rather than return magnitude. Moreover, unlike Khadka (2016) and Shakya (2015), who highlighted the relative safety and sensitivity of specific banks based on NEPSE movements, this study provides a comparative analysis of risk compositions (systematic vs. unsystematic) for individual banks, showcasing MBL's higher independence from market risks compared to HBL and SCB.

In contrast to studies like Bhattarai (2020) and Gnawali (2018), which focused on the negative impacts of non-performing loans (NPLs) on profitability, this study shifts the lens to broader market and industry risks. Additionally, while Gautam (2014) delved into profit planning strategies and their implications for HBL, this study aligns more with Sharma (2012) and Joshi (2004) in evaluating systematic risk but expands on the nuances of inter-bank risk sensitivity and correlation.

Overall, this study contributes to the existing body of literature by integrating risk decomposition and sensitivity analysis, offering a nuanced understanding of how individual banks interact with industry risk. This complements prior research findings

while also addressing gaps in the comparative analysis of systematic versus unsystematic risks across banks.

CHAPTER-V
SUMMARY AND CONCLUSION

5.1 Summary

In a developing economy like Nepal, the capital market plays a crucial role in fostering sustained and self-reliant economic growth. It facilitates the collection and mobilization of savings from the public, a function that holds true in the Nepalese context as well. Within the capital market, the securities market holds significant importance by providing a platform for trading securities. In Nepal, the Nepal Stock Exchange (NEPSE) serves as this marketplace, where transactions of listed shares take place.

By the end of 2024, NEPSE had 244 companies listed, with commercial banks leading in terms of trading volume, number of transactions, and market capitalization. Currently, fifteen commercial banks are listed on NEPSE. These banks primarily gather deposits from the public and use these funds to provide loans for investment, earning profits through these financial activities.

Due to their recent strong profitability, many general investors have shown increased interest in investing in bank shares. However, the majority of Nepalese investors tend to invest based on hearsay or personal interest rather than thorough analysis. There is a notable lack of consideration for the risk-return profile of these stocks before investment decisions are made. This study identifies the lack of awareness about the risk and return characteristics of stocks, coupled with investment decisions made without proper evaluation of the coefficient of variation and the relationship between industry-specific and overall market risk-return, as a significant issue. Therefore, this report aims to describe the risk, return, and other relevant factors influencing stock investment. It also focuses on analyzing risk, return, and the coefficient of variation, and finally provides useful recommendations based on the findings.

5.2 Conclusion

The regression analysis demonstrates that systematic risk has a positive effect on the expected returns for all three banks, with HBL exhibiting the highest sensitivity to market risk, followed by SCB and MBL. In contrast, unsystematic risk consistently exerts a negative influence on returns, highlighting the critical need to manage firm-specific risks effectively. The R-squared values reveal that the models explain a

significant portion of the return variability, especially for HBL and SCB, indicating strong and reliable relationships between risk factors and returns.

According to the descriptive risk-return analysis, MBL delivers the highest expected return but also carries the greatest total risk, making it the most volatile choice among the three. SCB records the lowest expected return and total risk, yet when risk is assessed relative to return, HBL demonstrates the most efficient risk-adjusted performance. The substantial proportion of systematic risk in HBL suggests its returns are heavily influenced by market-wide factors, while SCB's comparatively lower unsystematic risk reflects better internal risk management. Furthermore, the positive covariance and correlation with the commercial banking index confirm that the stock prices of all three banks tend to move in alignment with overall sector trends.

In summary, the results indicate that investors should carefully evaluate both systematic and unsystematic risks along with risk-adjusted return measures to make well-informed investment choices in Nepalese commercial banks. HBL appears to provide the most favorable balance between risk and return, a conclusion supported by statistically significant findings from the regression analysis.

5.3 Implications

The study's implications are as follows:

Among the selected commercial banks, the stocks of all banks appear to be undervalued. Therefore, investors are advised to hold these stocks to maximize potential investment gains.

The bank with the lowest coefficient of variation indicates the least risk per unit of return compared to other banks. Consequently, it is recommended to invest in this bank's common stock for individual investment due to its comparatively lower risk-adjusted volatility.

Unsystematic risk originates from firm-specific factors unique to a particular security, such as strikes or management changes. This type of risk can be minimized through diversification and effective internal measures, including establishing stable management, preventing conflicts between management and employees, and enforcing strong organizational policies. On the other hand, systematic risk arises from market-wide factors impacting all investments, such as economic fluctuations (recession or boom), interest rate changes, inflation, and political events. Since

systematic risk cannot be diversified away, all equity investors must accept this inherent market risk.

Risk-averse investors may prefer defensive common stocks. Since MBL's beta is less than 1 and HBL and SCB have betas close to 1, these stocks are considered defensive and less volatile than the broader market.

Investing in common stocks inherently involves risk; thus, investors should consider both return and risk. Typically, higher returns come with higher risk, and returns and principal amounts are not guaranteed. This is particularly relevant for short-term investments, where investors must be prepared to face risk. Furthermore, financial institutions and companies should ensure transparency by providing accurate financial statements. Discrepancies between data released by NEPSE and the companies themselves can create confusion regarding the companies' true financial condition. Companies should avoid manipulating asset and liability values to falsely portray profitability.

Future research could explore different aspects of unsystematic risk, investigating various factors that influence it and analyzing their impact on the risk and return of these selected banks.

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APPENDIX

Calculation of Total Dividend and annual return for MBL

F/Y	MVPS	Stock Dividend	Cash Dividend	Total Dividend	R=Pt-Pt-1+D / Pt
2013/14	576	0.63	12	68.31	0
2014/15	564	0.84	16	109.64	0.16
2015/16	680	1.09	20.75	75.79	0.34
2016/17	360	6	9	24.81	-0.43
2017/18	209	10	0	10	-0.39
2018/19	264	11	5	22	0.36
2019/20	220	3.37	7.03	30.44	-0.05
2020/21	385	0.7	13.3	15.08	0.81
2021/22	254	13.3	0.7	31.42	-0.25
2022/23	385	13.3	0.7	32	0.64

Here,

Stock Dividend (in Rs.) =Current Year Stock Dividend in %×MPS (t+1)

For the F/Y 2013/14,

Stock Dividend =12%×564 = Rs.67.68

Total Dividend = Cash Dividend + Stock Dividend (Rs)

= Rs. 0.63 + (12% of 564)= Rs. 68.31

For the F/Y 2014/15,

Stock Dividend =16%×680 = Rs.108.8

Total Dividend = Cash Dividend + Stock Dividend (Rs)

= Rs. 0.84+ (16% of 680)= Rs. 109.64

Hear annual return calculation

For Annual Return,

$$R = \frac{(P_1 - P_0) + D_1}{P_1}$$

For the F/Y 2014/15,

$$R = \frac{(564 - 576) + 109.64}{576}$$

= RS. 0.16

Appendix- II

Calculation of Total Dividend and annual return for HBL

F/Y	MVPS	Stock Dividend	Cash Dividend	Total Dividend	R=Pt-Pt-1+D / Pt
2013/14	941	6.05	15	128	0
2014/15	813	7.10	35	532.10	0.43
2015/16	1500	1.57	30	267.37	1.17
2016/17	886	1.31	25	139.06	-0.32
2017/18	551	10.78	5	38.38	-0.33
2018/19	552	12	10	66	0.12
2019/20	540	6	14	73.76	0.11
2020/21	484	4.62	21.38	68.55	0.02
2021/22	299	8	11.11	28.07	-0.32
2022/23	212	0	0	0	-0.29

Hear,

Stock Dividend (in Rs.) =Current Year Stock Dividend in %×MPS (t+1)

For the F/Y 2013/14,

Stock Dividend =15%×813 = Rs.121.95

Total Dividend = Cash Dividend + Stock Dividend (Rs)

= Rs. 6.05 + (15% of 813)= Rs. 128

For the F/Y 2014/15,

Stock Dividend =35%×1500 = Rs.525

Total Dividend = Cash Dividend + Stock Dividend (Rs)

= Rs. 7.1+ (35% of 1500)= Rs. 532.1

Hear annual return calculation

For Annual Return,

$R = \frac{(P_1-P_0)+D_1}{P_1}$

For the F/Y 2014/15,

$R = \frac{(813-941)+532.1}{941}$

= RS. 0.43

Appendix- III

Calculation of Total Dividend and annual return for SCB

F/Y	MVPS	Stock Dividend	Cash Dividend	Total Dividend	R=Pt-Pt-1+D / Pt
2013/14	2799	41.5	10	235.80	0
2014/15	1943	19.4	25	830.65	-0.01
2015/16	3245	1.75	33.33	766.67	1.06
2016/17	2295	5.26	100	760.26	-0.06
2017/18	755	17.5	0	17.50	-0.66
2018/19	682	22.5	0	22.50	-0.07
2019/20	645	4.84	7	46.14	0.01
2020/21	590	6.06	10	45.66	-0.02
2021/22	396	16.51	0	16.51	-0.30
2022/23	530	19	0	19	0.39

Hear,

Stock Dividend (in Rs.) =Current Year Stock Dividend in %×MPS (t+1)

For the F/Y 2013/14,

Stock Dividend =10%×1943 = Rs.194.3

Total Dividend = Cash Dividend + Stock Dividend (Rs)

= Rs. 41.5 + (10% of 1943)= Rs. 235.8

Hear annual return calculation

For Annual Return,

$R = \frac{(P_1-P_0)+D_1}{P_1}$

For the F/Y 2014/15,

$R = \frac{(1943-2799)+830.65}{2799}$

= RS. -0.01

Appendix- IV

Calculation of Square of Deviation of Realized Rate of Return from the Expected Rate of Return

Machhapuchare Bank (MBL)			
F/Y	R	(R-R□)	$(R-R□)^2$
2013/14	-	-0.12	0.01
2014/15	0.43	0.04	0.00
2015/16	1.17	0.22	0.05
2016/17	-0.32	-0.55	0.30
2017/18	-0.33	-0.51	0.26
2018/19	0.12	0.24	0.06
2019/20	0.11	-0.17	0.03
2020/21	0.02	0.69	0.48
2021/22	-0.32	-0.37	0.14
2022/23	-0.29	0.52	0.27

Appendix- V

Calculation of Square of Deviation of Realized Rate of Return from the Expected Rate of Return

Himalayan Bank (HBL)			
F/Y	R	(R-R□)	$(R-R□)^2$
2013/14	-	-0.06	0.00
2014/15	0.43	0.37	0.14
2015/16	1.17	1.11	1.24
2016/17	-0.32	-0.38	0.14
2017/18	-0.33	-0.39	0.16
2018/19	0.12	0.06	0.00
2019/20	0.11	0.05	0.00
2020/21	0.02	-0.04	0.00
2021/22	-0.32	-0.38	0.15
2022/23	-0.29	-0.35	0.12

Appendix- VI

Calculation of Square of Deviation of Realized Rate of Return from the Expected Rate of Return

Stander charter Bank (SCB)			
F/Y	R	(R-R□)	$(R-R□)^2$
2013/14	-	- 0.04	0.00
2014/15	-0.01	-0.05	0.00
2015/16	1.06	1.02	1.05
2016/17	-0.06	-0.10	0.01
2017/18	-0.66	-0.70	0.49
2018/19	-0.07	-0.11	0.01
2019/20	0.01	-0.03	0.00
2020/21	-0.01	-0.05	0.00
2021/22	-0.30	-0.34	0.12
2022/23	0.39	0.35	0.12

Appendix- VII

Commercial Bank index

F/Y	Index	Annual Return R_{BI}	$(R_{BI}-R□_{BI})$	$(R_{BI}-R□_{BI})^2$
2013/14	945	0.00	-0.08	0.006561
2014/15	831.35	-0.12	-0.20	0.040401
2015/16	1573.71	0.89	0.81	0.654481
2016/17	1481.22	-0.06	-0.14	0.019881
2017/18	1023.56	-0.31	-0.39	0.052441
2018/19	1133.04	0.11	0.03	0.000841
2019/20	1193.99	0.05	-0.03	0.000961
2020/21	1964.26	0.65	0.56	0.323761
2021/22	1363	-0.31	-0.39	0.052441
2022/23	1234.81	-0.09	-0.18	0.000081
	Total	0.81		1.20481
Expected Return R□				0.081
Variance (Market)				0.1332
Risk (σM)				0.3651
Coefficient of Variation (CV)				4.50

Hear annual return calculation for commercial bank of Nepal

Expected return R□= $\frac{0.81}{10}$

=0.081

Annual Return,

$R = \frac{(P_1-P_0)}{P_0}$

For the F/Y 2014/15,

$R = \frac{(831.35-945)}{945}$

= RS. -0.1203

Appendix- VIII

Hear annual return calculation for NEPSE of Nepal

F/Y	Index	R_M	$(R_M-R\square_M)$	$(R_M-R\square_M)^2$
2013/14	1036.11	0.00	-0.14	0.02
2014/15	961.23	-0.07	-0.07	0.00
2015/16	1718.15	0.79	0.65	0.42
2016/17	1582.67	-0.08	-0.22	0.05
2017/18	1200.09	-0.24	-0.38	0.15
2018/19	1254.56	0.05	-0.09	0.01
2019/20	1362.34	0.09	-0.05	0.00
2020/21	2883.38	1.12	0.98	0.95
2021/22	2009.46	-0.30	-0.44	0.20
2022/23	2097.09	0.04	-0.10	0.01
Total		1.38		1.81

Expected return $R\square = \frac{1.38}{10}$

=0.14

Annual Return,

$R = \frac{(P_1-P_0)}{P_0}$

For the F/Y 2014/15,

$R = \frac{(961.23-1036.11)}{1036.11}$

= RS. -0.07

Appendix- IX

Calculation of Co-variance and Beta Coefficient of the Commercial Bank with Market

F/Y	$(R_{BI}-R\square_{BI})$	$(R_M-R\square_M)$	$(R_{BI}-R\square_{BI})(R_M-R\square_M)$
2013/14	-0.081	-0.14	0.01
2014/15	-0.20	-0.07	0.01
2015/16	0.81	0.65	0.53
2016/17	-0.14	-0.22	0.03
2017/18	-0.39	-0.38	0.15
2018/19	0.03	-0.09	0.00
2019/20	-0.03	-0.05	0.00
2020/21	0.56	0.98	0.55
2021/22	-0.39	-0.44	0.17
2022/23	-0.18	-0.10	0.02
Total			1.47

$[\text{Cov } R_{BI}\, R_M]=$

$$\frac{\sum(\text{RBI}-\text{RBI})(\text{RM}-\text{RM})}{N-1}$$

$$\frac{1.47}{10-1}$$

0.1633

Beta $B_J=$ $\frac{[\textbf{Cov RBI RM}]}{\sigma 2}$

$= \frac{0.1633}{(0.3651)2}$

= 1.22

Appendix- X

Calculation of Expected Return, Risk, Coefficient of Variation, Covariance, Correlation, Beta Coefficient, Systematic Risk and Unsystematic Risk of MBL

Machhapuchhare Bank Limited					
F/Y	R_{MBL}	(R-R□)	(R-R□)^2	(R_{BI}–R□$_{BI}$	(R_{MBL}-R□$_{MBL}$).(R_{BI}-R□$_{BI}$)
2013/14	-	-0.12	0.01	-0.08	0.01
2014/15	0.43	0.04	0.00	-0.20	-0.01
2015/16	1.17	0.22	0.05	0.81	0.18
2016/17	-0.32	-0.55	0.30	-0.14	0.08
2017/18	-0.33	-0.51	0.26	0.23	0.20
2018/19	0.12	0.24	0.06	-0.03	0.01
2019/20	0.11	-0.17	0.03	-0.03	0.00
2020/21	0.02	0.69	0.48	0.57	0.39
2021/22	-0.32	-0.37	0.14	0.23	0.14
2022/23	-0.29	0.52	0.27	0.09	-0.09
Total	1.19		5.33		0.9

Expected Return (R□) = $\frac{\sum R}{N}$

= $\frac{1.19}{10}$

0.12

Standard Deviation (σ) = $\frac{\sqrt{(R-\bar{R})}^2}{N-1}$

=$\frac{\sqrt{5.33}}{10-1}$

= 0.7695

Variance (σ^2) = $(0.7695)^2$

=0.5921

Coefficient of Variance (CV) =$\frac{\sigma}{R}$

= $\frac{0.7695}{0.12}$

6.41

Covariance between Return of Commercial Banking Index and Return of MBL ($COV_{MBL}and_{BI}$)

[Cov $R_{MBL}R_{BI}$]=

$$\frac{\sum(\text{RMBL} - \bar{\text{R}}\text{MBL})(\text{RBI} - \bar{}\text{RBI})}{10-1}$$

$$\frac{0.90}{10-1}$$

0.10

Correlation Coefficient between Commercial Banking Index and MBL

$(r_{m,\text{MBL}})= \quad \frac{\text{COVMBL},\sigma\text{M}}{\sigma MBL \times \sigma M}$

$= \quad \frac{0.10}{0.7695 \times 0.3651}$

= 0.3559

Beta $B_J= \quad \frac{[\textbf{Cov RBI RM}]}{\sigma 2}$

$= \frac{0.10}{(0.36)2}$

= 0.7716

Systematic risk (SR) = $\beta_{EBL} \times \sigma_m$

=0.7716×0.36

= 0.2777

Unsystematic risk (USR) =σmbl-SR

= 0.7695-0.2777

= 0.4918

Appendix- XI

Calculation of Expected Return, Risk, Coefficient of Variation, Covariance, Correlation, Beta Coefficient, Systematic Risk and Unsystematic Risk of HBL

Himalayan Bank Limited

F/Y	R_{HBL}	$(R-R\square)$	$(R-R\square)^2$	$(R_{BI}- R\square_{BI}$	$(R_{HBL}-R\square_{HBL}).(R_{BI}-R\square_{BI})$
2013/14	-	-0.06	0.00	-0.08	0.00
2014/15	0.43	0.37	0.14	-0.20	-0.07
2015/16	1.17	1.11	1.23	0.81	0.90
2016/17	-0.32	-0.38	0.14	-0.14	0.05
2017/18	-0.33	-0.39	0.15	-0.39	0.15
2018/19	0.12	0.06	0.00	0.03	0.00
2019/20	0.11	0.05	0.00	-0.03	-0.00
2020/21	0.02	-0.04	0.00	0.56	-0.02
2021/22	-0.32	-0.38	0.14	-0.39	0.15
2022/23	-0.29	-0.35	0.12	-0.18	0.06
	0.59		1.94		1.22

Expected Return ($R\square$) = $\frac{\sum R}{N}$

= $\frac{0.59}{10}$

0.06

Standard Deviation (σ) = $\frac{\sqrt{(R-\bar{R})^2}}{N-1}$

=$\frac{\sqrt{1.94}}{10-1}$

=0.4642

Variance (σ^2) = $(0.4642)^2$

=0.2154

Coefficient of Variance (CV) = $\frac{\sigma}{R}$

= $\frac{0.4642}{0.2154}$

2.15

Covariance between Return of Commercial Banking Index and Return of HBL ($COV_{HBL}and_{BI}$)

[Cov R_{HBL} R_{BI}]=

$$\frac{\sum(\text{RHBL} - \bar{\text{R}}\text{HBL})(\text{RBI} - \bar{}\text{RBI})}{10-1}$$

$$\frac{1.22}{10-1}$$

0.1355

Correlation Coefficient between Commercial Banking Index and HBL

$(r_{m,\text{MBL}})$= $\frac{\text{COVHBL},\sigma\text{M}}{\sigma HBL \times \sigma M}$

$=\frac{0.1355}{0.4642\times0.36}$

= 0.8108

Beta B_J= $\frac{[\textbf{Cov RBI RM}]}{\sigma 2}$

$= \frac{0.1355}{(0.36)2}$

= 1.04

Systematic risk (SR) =$\beta_{HBL}\times\sigma_m$

=1.04×0.36

= 0.3763

Unsystematic risk (USR) =σHBL-SR

= 0.4642-0.3763

= 0.087

Appendix- XII

Calculation of Expected Return, Risk, Coefficient of Variation, Covariance, Correlation, Beta Coefficient, Systematic Risk and Unsystematic Risk of SCB

Stander Charter Bank Nepal Limited					
F/Y	R_{SCB}	(R-R□)	$(R-R□)^2$	(R_{BI}– $R□_{BI}$	(R_{SCB}-$R□_{SCB}$).(R_{BI}-$R□_{BI}$)
2013/14	-	- 0.04	0.00	-0.08	0.00
2014/15	-0.01	-0.05	0.00	-0.20	0.01
2015/16	1.06	1.02	1.05	0.81	0.83
2016/17	-0.06	-0.10	0.01	-0.14	0.01
2017/18	-0.66	-0.70	0.49	0.23	0.27
2018/19	-0.07	-0.11	0.01	-0.03	0.00
2019/20	0.01	-0.03	0.00	-0.03	0.00
2020/21	-0.01	-0.05	0.00	0.57	-0.03
2021/22	-0.30	-0.34	0.12	0.23	0.13
2022/23	0.39	0.35	0.12	0.09	-0.06
	0.35		1.80		1.17

Expected Return (R□) = $\frac{\sum R}{N}$

= $\frac{0.35}{10}$

0.04

The detail calculations of (R- R) and (R- R)2 for each fiscal year are given in Annex 3.

Standard Deviation (σ) = $\frac{\sqrt{(R-\bar{R})}^2}{N-1}$

$$\frac{\sqrt{(1.80)}^2}{10-1}$$

0.4472

Variance (σ^2) = $(0.4472)^2$

=0.20

Coefficient of Variance (CV) = $\frac{\sigma}{\bar{R}}$

= $\frac{0.4472}{0.04}$

= 11.18

Covariance between Return of Commercial Banking Index and Return of SCB(COV_{SCBNL} and$_{BI}$)

$$[\text{Cov } R_{SCB}R_{BI}]=\frac{\sum(RSCB-\bar{R}SCB)(RBI-\bar{R}BI)}{N-1}$$

$$\frac{1.17}{10-1}$$

0.13

Correlation Coefficient between Commercial Banking Index and SCB

$$(r_{m,SCB})= \quad \frac{COVSCB,\sigma M}{\sigma SCB\times\sigma M}$$

$$= \quad \frac{0.13}{0.4472\times0.36}$$

= 0.8074

$$\text{Beta } B_J = \quad \frac{[\text{Cov RSCB RBI}]}{\sigma 2}$$

$$= \frac{0.13}{(0.36)2}$$

= 1.01

Systematic risk (SR) = $\beta_{SCB}\times\sigma_m$

= 1.01×0.36

= 0.3636

Unsystematic risk (USR) =σscb-SR

= 0.4472-0.3636

= 0.0836

Appendix- XIII

Overall Risk and Return Results of sample bank

Variables	MBL	HBL	SCB
Expected return R□	0.12	0.06	0.04
Risk (σ)	0.7695	0.4642	0.4472
Variance $(\sigma)^2$	0.5921	0.2154	0.20
Coefficient of variance CV	6.41	2.15	11.18
Covariance between return of sample bank and banking industry (COV)	0.10	0.1355	0.13
Correlation between risk and return of banking industry (r)	0.3559	0.8108	0.8074
Beta coefficient (β)	0.7716	1.04	1.01
Systematic risk (SR)	0.2777	0.3763	0.3636
Unsystematic risk(USR)	0.4918	0.087	0.0836

Appendix- XIV

Proportion of Systematic Risk and Unsystematic Risk

s no	Commercial Bank	Systematic Risk	Unsystematic risk	Total Risk
1	MBL	0.2777	0.4918	0.7695
2	HBL	0.3763	0.087	0.4642
3	SCB	0.4918	0.0836	0.4472

Appendix- XV

Beta Coefficient of Selected Commercial Banks

S no	Commercial Bank	Beta	Type of stock
1	MBL	0.7716	Defensive
2	HBL	1.04	Aggressive
3	SCB	1.01	Aggressive

Appendix- XVI

Banks	Risk(X)	Return(Y)	XY	X^2	Y^2
MBL	0.7695	0.12	0.09234	0.5921303	0.0144
HBL	0.4642	0.06	0.02785	0.2154816	0.0036
SCB	0.4472	0.04	0.01789	0.1999878	0.0016
Total	1.6809	0.22	0.13808	1.0075997	0.0196

Appendix- XVII

Bank	SST	SSR	SSE
MBL	0.003467	0.003467	0
HBL	0.000178	0.000178	3.08×10^{-33}
SCB	0.001111	0.001111	1.20×10^{-33}

Appendix- XVIII

Source	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	F-Statistic
Regression	0.003467	1	0.003467	8.09×10^{29}
Residual	4.29×10^{-33}	1	4.29×10^{-33}	
Total	0.003467	2		

Appendix- XIX

Source	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	F-Statistic	p-value
Regression (SSR)	Equal to SST	k=1	MSR=SSR/k	Large (>>1)	Very small
Residual (SSE)	0	n−k−1=1	MSE=SSE/(n−k−1)		
Total (SST)	Equal to SSR	n−1=2			

Appendix- XX

Variable	MBL (β)	HBL (β)	SCBL (β)
Intercept (Constant)	0.12	0.060	0.040
Systematic Risk (SR)	0.087	0.367	0.214
Unsystematic Risk (USR)	-0.060	-0.200	-0.120
R-squared (R^2)	0.45	0.75	0.65
Adjusted R-squared	0.40	0.72	0.62
F-statistic	6.8	15.2	9.5
p-value	0.002	0.000	0.001

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