Vol. 19 (2026): Proceedings of 2026 International Conference on Financial Technology, Mathematical Statistics, and Business Analytics (ICFMB 2026)
E-ISSN: 3105-0522 P-ISSN: 3105-0514
DOI: https://doi.org/10.70267/icfmb.202619410417

Integrating CAPM, NPV, and Capital Structure in Corporate Investment Decisions

Junqin Wang*

Institute of Accounting, Jiangxi University of Finance and Economics, Nanchang, China

**Corresponding author: Junqin Wang.*

Abstract

Corporate investment decisions are the core of modern corporate finance, and directly determines the realization of a company's final goal: shareholder wealth maximization. However, the traditional isolated application of the Capital Asset Pricing Model, Net Present Value and capital structure theory often leads to biased investment evaluations, failing to fully reflect the interactive relationship between project risk, financing structure, and project value. The study aims to fill this research gap by integrating these three core financial frameworks. Firstly, it systematically introduces the core definition, application scenarios, advantages, and inherent limitations of CAPM, NPV, and capital structure theory respectively. In addition, it explores the intrinsic links among the three frameworks: CAPM quantifies the systematic risk of projects to determine the cost of equity, capital structure adjusts the debt-equity mix to reshape the Weighted Average Cost of Capital (WACC), and NPV uses the risk-adjusted WACC to evaluate project acceptability. Therefore, a unified systematic valuation framework integrating the three frameworks is constructed. Furthermore, the paper discusses the application of the integrated framework in complex projects and analyzes its practical implementation obstacles, and puts forward future research directions: incorporating behavioral corporate finance and real options theory, and constructing integrated decision support systems based on machine learning and big data. The research enriches the academic research on corporate investment decision-making, corrects the deviations of traditional isolated decision models, and provides guidance for enterprises to make scientific investment decisions and enhance shareholder wealth creation capacity.

Keywords

capital asset pricing model (CAPM), net present value (NPV), capital structure, investment decision

1. Introduction

Corporate investment decisions lie at the heart of modern financial management, fundamentally determining a firm's growth trace and its ability to generate shareholder value. These decisions, however, are inherently complex, requiring a simultaneous evaluation of project viability, risk exposure, and financing structures. Over the past decades, three foundational theories have emerged to address these dimensions: the Net Present Value rule for project valuation, the Capital Asset Pricing Model for risk-adjusted return estimation, and the optimal capital structure theory for capital structure analysis [1]. Despite their individual prominence, these frameworks have often been applied in isolation, leaving a critical gap in understanding their interactive effects on investment behavior. The necessity of integrating these models has become increasingly unignorable due to recent empirical evidence. For instance, a 2023 survey related to financial analysis practices found that over 68% of financial analysts still rely on CAPM for cost of equity estimation, yet fewer than 30% formally incorporate capital structure dynamics into project-level analysis [2]. This disconnect can lead to biased investment evaluations, particularly in leveraged firms where financing mix significantly influences both risk perception and value creation [3].

Despite a large number of research on each theoretical tool individually, the literature lacks a unified analytical framework that captures the synergies and trade-offs among asset pricing, valuation, and capital structure in investment decision-making. While studies have explored interactions between the tools, such as the impact of leverage on beta estimation [4] or the role of tax shields in NPV adjustments [5] —few have attempted to integrate these elements into a coherent model that reflects real-world corporate complexity, which limits both academic understanding and practical application, leaving managers without a systematic tool to evaluate how financing choice influence project risk and value.

This review paper aims to fill that gap by integrating CAPM, NPV, and capital structure theory into a comprehensive framework for analyzing corporate investment decisions. Firstly, a brief description of the core theoretical tools is given, as well as the application scenarios, advantages and limitations respectively. The application of the integrated framework is presented. In the end, it demonstrates the potential future research directions.

2. Core Theoretical Tools: CAPM, NPV, and Capital Structure

2.1 CAPM

$$\text{Formula: Ri} = \text{Rf} + \beta(\text{Rm} - \text{Rf}). \tag{1}$$

Ri refers to the expected rate of return of the investment. Rf refers to the risk-free rate of return, which is usually measured by one-year based US treasury bills. β is the β value of the investment. Rm is the average rate of return from market portfolio.

From the above formula, we can draw the following conclusions: Firstly, the return rate of asset is composed of two parts. The one is the rate of return of the risk-free asset, the another is the risk compensation of the asset. The β coefficient quantifies the systematic risk, the higher the β coefficient is, the higher the risk that can not be diverted, so greater compensation should be applied. Secondly, since the unsystematic risk can be eliminated through diversified investing, there's no need for compensation. However, the systematic risk is always exists, so the investor will ask for a higher return to compensate for this risk. Lastly, the CAPM supposes all the investors are rational, which means they will make the best investing decision by focusing on market portfolio to minimize the unsystematic risk [6].

2.2 NPV

NPV shows how profitable an investment project is during its lifetime. It is the net gain you get by considering all the future cash flows and discounting them back to the present value using a specific discount rate.

The total Net Present Value for the whole project is calculated like this:

$$\text{NPV} = \text{P1}/(1+\text{i}) + \ldots + \text{Pt}/(1+\text{i})^{\text{t}} - \text{C} \tag{2}$$

P = Net cash flow for each year

i = Discount rate

C = Initial investment

If NPV > 0: The project earns more than the initial investment. It is worth doing.

If NPV < 0: The project does not earn back the initial investment. It is not financially acceptable.

It is worth noting that there is a common fallacy in practical application that NPV implicitly assumes the reinvestment of interim cash flows, which has been repeatedly corrected by scholars [5]. In fact, neither NPV nor IRR requires such an assumption, and the misunderstanding of this point may lead to biased investment evaluations [7].

2.3 Capital Structure: Financing Costs, Effects of Financial Leverage, Optimal Capital Structure Theory

Capital structure refers to the composition of a company's capital and their proportion. It is the final presentation of a company's financing combination in a given time period. Capital structure is dynamic, it will change frequently with the transformation of a company's financing decision and financing methods, which influences the sources and value of the capital flowing into the business [8].

In a broad sense, a company's capital composition can be divided into debt capital and equity capital. The proportional relationship and combination of these two form the capital structure. In a narrow sense, capital structure refers to the composition of various long-term capitals, especially the combination of long-term debt capital and long-term equity capital. The operational efficiency of the capital structure affects the company's management and shareholders' equity. When the capital structure achieves the goal of maximizing shareholder wealth, it is called the optimal capital structure [9].

The optimal capital structure is crucial to the weighted average cost of capital (WACC), which further affects enterprise valuation and capital budgeting [3].

2.4 Analysis of the Application Scenarios, Advantages, and Inherent Limitations of Each Theory

The CAPM is widely used when an investor wants to quantify the risk premium during the process of calculating required return from an investment. There are two obvious advantages of using the method: The one is it generates the relationship between required return and systematic risk. The another is it takes into account a company's level of systematic risk relative to the stock market as a whole, which is a much better method than the traditional dividend valuation model [1]. Unfortunately, the model also has several disadvantages. Firstly, it makes unrealistic assumptions that the market is completely efficient and all the investors are rational and risk averse [10]. Secondly, the cited variables of CAPM lack accuracy, since it uses the yield of short-term government debt as risk-free rate of return and the equity β is not always constant, but changes over time [2]. Moreover, as a single-factor model, CAPM only considers systematic risk, which limits its applicability in some scenarios [6].

The advantages of NPV are: (a). It considers the time value of money. (b). It takes all the cash flows during a project's lifetime into account. (c). Through adjusting the discount rate, it can represent the change of risk timely. (d). Compared with the payback period method, it focuses more on long-term profitability. The disadvantages of NPV are the following: (a). It is difficult to predict future cash flows, especially when there exist risk and uncertainty [11]. (b). It is difficult to determine the discount rate since it may change over the life of the project [12]. In addition, the misunderstanding of the reinvestment assumption of NPV may also lead to wrong investment decisions [5].

Using capital structure to guide corporate investment decisions offers several advantages: it optimizes the cost of capital through debt financing, preserves ownership by avoiding too much equity financing, and enforces financial discipline that discourages investment in marginal projects. However, this approach also presents significant disadvantages: excessive leverage increases financial risk and potential bankruptcy costs, which may lead to a decrease in investment as managers consider liquidity over profitability, and can create agency problems where shareholders pursue high-risk strategies at the expense of creditor's interest [13]. In addition, the ambiguity aversion of equity holders will also reduce the optimal leverage level, and even make companies choose zero leverage to avoid bankruptcy risks [13].

3. Intrinsic Links and Integrated Framework of the Theories

3.1 CAPM, Financing Choices and Their Impact on NPV Discount Rate

The systematic risk of an investment project, measured by the beta coefficient in the Capital Asset Pricing Model, is a primary factor of a firm's financing decisions, as it directly reflects the project's exposure to market volatility [1]. A project with a high asset beta indicates high systematic risk, which raises the probability of financial distress if the project is accepted. In such cases, managers tend to avoid excessive debt financing, as fixed interest payments would strengthen financial pressure and increase the risk of default. Conversely, low-beta projects with stable cash flow projections are regarded as less risky, making debt financing a more attractive option for firms to leverage and boost potential returns for shareholders [4].

This relationship between project risk and financing structure creates a critical feedback loop with the Net Present Value (NPV) valuation through the discount rate. The discount rate used in NPV analysis is typically the firm's Weighted Average Cost of Capital, which mixes the cost of equity and debt. While a project's inherent business risk (measured by asset beta) sets the cost of equity through CAPM, the choice of capital structure change this cost and the overall WACC [9]. Adding debt to the capital structure introduces financial leverage, which means shareholders demand a higher return to compensate for the additional financial risk associated with leveraged operations. This upward adjustment of the cost of equity alters the WACC, which in turn changes the discount rate applied to future cash flows in NPV calculations. In short, CAPM quantifies the risk that shapes financing choices, and those financing choices reshape the discount rate that is central to NPV-based project valuation [14].

3.2 Construction of a Systematic Decision-making Framework

A reliable corporate investment decision-making framework must integrate CAPM, NPV, and capital structure into a incessant, step by step analytical process, ensuring that risk, financing, and valuation are not treated as independent factors but as indispensable components of strategic decision-making. The framework begins with a risk assessment using CAPM: Firstly, the risk-free rate of return and the market risk premium are identified, then the project's asset beta is estimated to calculate the project-specific cost of equity using the formula $Ri=Rf+\beta(Rm-Rf)$. This step ensures that the cost of equity fully reflects the project's systematic risk, leaving a scientific foundation for subsequent valuation [10].

The second step is introducing capital structure into the analysis by using the WACC in the firm's targeted debt-equity mix. The cost of debt (adjusted for tax shields from interest payments) is combined with the cost of equity (given in CAPM), weighted by the proportion of debt and equity in the targeted capital structure, to compute the project's WACC. This step accounts for the unsystematic risk introduced by leverage, adjusting the discount rate with the firm's actual financing strategy [3]. The final step is applying this risk-adjusted WACC as the discount rate to calculate the total NPV in the NPV analysis. If the NPV is positive, the project is financially acceptable, as it generates value for shareholders after accounting for both systematic and unsystematic risk; a negative NPV indicates the project fails to meet the risk-adjusted required return and should be rejected.

4. Applications and Challenges of the Integrated Framework

4.1 Applications in Complex Project Evaluation and Strategic Investments

The integrated CAPM-NPV-capital structure framework is useful for evaluating complex, large-scale projects and strategic investments, where traditional isolated analysis often fails to capture the interplay of risk and financing [3]. A key application is in cross-border investment projects, which face unique systematic risks such as exchange rate volatility, political instability, and country-specific market fluctuations. Using CAPM, firms can estimate a country-specific beta to quantify these additional systematic risks, adjusting the cost of equity to reflect the unique market environment of the target country [15]. This ensures that cross-border investment decisions account for both local market risk and the optimal financing mix for the foreign market. A practical example is Exxon Mobil's 2006 Argentine oil and gas project, a leading case of emerging market cross-border investment. The firm used the integrated CAPM-NPV framework to account for Argentinian specific systematic risks, adjust the cost of equity and WACC, and calculate the project's NPV and IRR for investment decision-making [16].

Another critical application is in mergers and acquisitions(M&A), a core strategic investment for firms seeking growth. The framework helps acquirers evaluate the target firm's inherent business risk (through CAPM beta estimation) and design a financing structure for the M&A deal. By adjusting the WACC to the chosen financing structure, the acquirer can accurately calculate the NPV of the M&A project, considering not only the target's cash flow potential but also the financial risk of the acquisition's financing [17]. In all these cases, the integrated framework turns fragmented data on risk and financing into a clear valuation of project acceptability, guiding more rational strategic decisions.

4.2 Practical Implementation Obstacles

Despite its strong theoretical foundation, the integrated framework faces several tangible obstacles that limit its implementation in real-world situations, with data limitations being the most prominent [18]. Estimating a project-specific beta for CAPM is extremely challenging, especially for new ventures, research and development (R&D) projects, or divisions within diversified firms. These projects lack historical market data, forcing managers to use industry average betas as an alternative, which introduces inaccuracy and fails to capture the project's unique risk evaluation [6]. Additionally, forecasting future cash flows for NPV analysis is inherently uncertain: market conditions, consumer demand, and operational costs can shift unexpectedly, making cash flow projections subjective and inaccurate [11].

The second major obstacle is the complexity of simultaneous multi-factor analysis. Implementing the framework requires managers to estimate and adjust multiple variables at once: the risk-free rate of return, market risk premium, project beta, cost of debt, optimal debt-equity ratio, and projected cash flows. A small error in one variable, such as an inaccurate beta estimate, can make a huge difference through the analysis, distorting the WACC and leading to a biased NPV calculation Finally, managerial cognitive limitations hinder effective implementation. Many corporate managers lack the specialized financial expertise to interpret the framework's outputs, or they rely on past experience instead of rigorous quantitative analysis. This would make the framework lose its theoretical benefits and fail to meet the expectations of management.

4.3 An Integrated Perspective on Risk Management

Systematic risk, measured by CAPM beta, is the external risk of the project, driven by numerous factors such as economic recessions, interest rate fluctuations, or industry downturns. It determines the project's cost of equity and sets the minimum return required to compensate for market risk [4]. Financial risk, by contrast, is a derivative risk introduced by the firm's capital structure: higher leverage increases financial risk, as fixed debt obligations create pressure even if the project generates expected cash flows. The framework links these two risks by showing how high systematic risk is combined with high financial leverage, which creates a risk amplification effect. During market downturns, the project's cash flows decline, and the firm is still obligated to make interest payments, leading to a much higher probability of financial distress than considering either risk alone.

Project-specific risk, including operational risks, agency problems and regulatory risks complements these two risks and is considered in the NPV stage of the framework. This risk affects the accuracy of cash flow projections: higher project-specific risk increases the volatility of expected cash flows, which in turn impacts the NPV's reliability [12]. By integrating all three risk dimensions, the framework allows managers to design more efficient risk mitigation strategies: for a high-beta project, reduce leverage to lower financial risk; for a project with high operational risk, improve cash flow projections and build contingency buffers. In this way, risk management becomes a unified part of investment valuation, not a separate process.

5. Future Research Directions

5.1 Incorporation of Behavioral Corporate Finance, Real Options and Dynamic Capital Structure Theories

The integrated framework of CAPM, NPV and capital structure established in this study is built on the premise of rational market participants and static financing structure assumptions, which deviate from the actual operation of corporate investment activities in the real market. Future research can incorporate behavioral corporate finance theories to explain the rational investor hypothesis, exploring how cognitive biases of corporate managers (such as overconfidence and loss aversion) affect the estimation of project beta in CAPM, the prediction of cash flows in NPV analysis and the selection of capital structure [19]. In addition, the traditional NPV method fails to account for the flexibility of corporate investment decisions, and the integration of real options theory can make up for this deficiency, since the research can further analyze how to value the option value of project expansion, suspension and abandonment in the NPV framework, and combine CAPM to quantify the risk of real options, so as to make the project valuation more in line with the actual needs of strategic investment. Moreover, the static analysis of capital structure in the current framework can be upgraded by introducing dynamic capital structure theories. Future studies can explore the dynamic adjustment path of debt-equity ratio under the constraints of market friction and financing cost, and clarify how the dynamic change of capital structure affects the continuous adjustment of WACC and the long-term NPV of projects, so as to make the integrated decision-making framework more adaptable to the dynamic evolution of corporate financing environment [18].

5.2 Integrated Decision Support Systems Based on Machine Learning and Big Data Analysis

The practical application of the CAPM-NPV-capital structure integrated framework is currently limited by the difficulty of accurate estimation and the complexity of multi-factors analysis, and the development of machine learning and big data analysis technology provides a feasible solution to tackle these limitations. Future research can focus on the construction of integrated decision support systems driven by big data and machine learning, which can realize the real-time collection and processing of multi-dimensional data such as market transaction data, corporate financial data and industry risk data [18]. On the one hand, machine learning algorithms (such as random forest and neural networks) can be used to optimize the estimation model of project beta, solve the problem of low accuracy of traditional CAPM parameter estimation caused by unstable beta coefficients, and improve the scientificity of risk pricing. On the other hand, big data analysis can be applied to predict the future cash flows of investment projects with higher precision, by mining the correlation between project cash flows and macroeconomic indicators, industry development trends and corporate operational data.

6. Conclusion

This study addresses the critical limitation in corporate investment decision-making research, where CAPM, NPV, and capital structure theory have long been applied in isolation, resulting in biased project evaluations and insufficient practical guidance. By integrating these three core financial frameworks, this paper constructs a unified, dynamic analytical framework that clarifies their intrinsic links, providing a comprehensive theoretical basis for investment decisions in complex market environments [10].

The research verifies that CAPM, NPV and capital structure are dynamically interrelated core elements of value creation in investment decisions: CAPM quantifies project systematic risk to scientifically estimate the cost of equity, capital structure adjusts financial leverage to reshape WACC, and NPV adopts the risk-adjusted WACC to discount future cash flows and judge project economic feasibility [9]. This integrated framework corrects the deviations of traditional isolated decision models, holistically connects systematic risk, financial risk and project-specific risk, and realizes more accurate investment evaluation by incorporating the feedback effect of financing choices on project risk and value [14].

In practice, the framework has significant application value for evaluating complex strategic investments such as cross-border projects and mergers and acquisitions, providing managers with a systematic tool to analyze the impact of financing structures on project value and identify risk from the combination of high project risk and excessive leverage [17]. Meanwhile, the study identifies practical implementation obstacles including difficult project beta estimation, multi-factor analysis complexity and managerial cognitive limitations.

This research enriches the academic research on corporate investment decision-making and improves the efficiency of practical investment decisions, helping enterprises enhance shareholder value creation capacity in markets [3].

References

[1] Qin, Z. (2024). The Application of CAPM Model in Stocks Investment and Alternatives Models of CAPM. In Proceedings of the 8th International Conference on Economic Management and Green Development (part8) (pp.443-448). Business Department, Chengdu University of Technology.

[2] Zhang, H. & Song, Q. (2023). A Comparative Study of CAPM Based on the US Stock Market. In Proceedings of the 2nd International Conference on Financial Technology and Business Analysis (part2) (pp.58-65). Syosset High School; Canterbury School.

[3] Kayo, E. K. (2026). Target Leverage and Cost of Capital in the Electricity Sector: Implications for Valuation and Public Policy. The Energy Journal, 47(3).

[4] Sakemoto, R. (2023). The long-run risk premium in the intertemporal CAPM: International evidence. Journal of International Financial Markets, Institutions & Money, 89.

[5] Magni, C. A. & Martin, J. D. (2025). The two sides of the reinvestment assumption fallacy in IRR and NPV. The Engineering Economist, 70(3).

[6] Du, M. (2022). A Review Study on the Analysis of Validity Validation of Chinese Stock Market Pairs Using CAPM. In Proceedings of 2022 International Conference on Financial Market and Enterprises Management Engineering (FMEME 2022) (pp.665-669). Wuhan Zhicheng Times Cultural Development Co., Ltd.

[7] Castagnoli, E. & Favero, G. (2024). A contribution to the NPV-IRR debate. Decisions in Economics and Finance, 48(1).

[8] Krystyniak, K. & Staneva, V. (2024). Executive gender and capital structure: New evidence from rebalancing events. Finance Research Letters, 65.

[9] Liao, J. (2023). Relationship Between Corporate Capital Structure and Company Value——Based on the CAPM and APT Model and the WACC Analysis. In Proceedings of the 2023 International Conference on Management Research and Economic Development (part1) (pp.380-390). John F.Kennedy Catholic Preparatory School.

[10] Li, S. (2023). The Development of CAPM Model and Its Application in the Field of Corporate Finance. In Proceedings of the 7th International Conference on Economic Management and Green Development (part3) (pp.224-230). Sino-British College, University of Shanghai for Science & Technology.

[11] Aggarwal, R. & Singh, S. P. (2019). An integrated NPV-based supply chain configuration with third-party logistics services. Journal of Revenue and Pricing Management, 18(5).

[12] Department of Chemical Engineering, University of California, Santa Barbara. (2019). Profitability, risk, and investment in conceptual plant design: Optimizing key financial parameters rigorously using NPV %. Computers and Chemical Engineering, 128.

[13] Attaoui, S., Cao, W. & Duan, X. (2021). Optimal capital structure, ambiguity aversion, and leverage puzzles. Journal of Economic Dynamics and Control, 129.

[14] Magni, C. A. (2007). Correct or incorrect application of CAPM? Correct or incorrect decisions with CAPM? European Journal of Operational Research, 192(2).

[15] Arouri, M. E. H., Nguyen, D. K. & Pukthuanthong, K. (2012). An international CAPM for partially integrated markets: Theory and empirical evidence. Journal of Banking and Finance, 36(9).

[16] Caseism.com, n.d., Case analysis: Project evaluation in emerging markets – Exxon Mobil oil and Argentina, viewed 5 April 2026, <https://caseism.com/case-analysis-project-evaluation-in-emerging-markets-exxon-mobil-oil-and-argentina-86229>.

[17] Attaoui, S., Cao, W. & Six, P. (2021). Capital Structure and the Optimal Payment Methods in Acquisitions. International Review of Law and Economics, 66(prepublish).

[18] Amini, S., Elmore, R., Öztekin, Ö. & Strauss, J. (2021). Can machines learn capital structure dynamics? Journal of Corporate Finance, 70.

[19] Pape, J. (2025). Present bias, risk management and capital structure. Journal of Economic Behavior and Organization, 236.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgment

This paper is an output of the science project.