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## HYBRID

AND AVANT-GARDE METHODS FOR COST OF CAPITAL EVALUATION

## MÉTODOS HÍBRIDOS Y DE VANGUARDIA PARA LA EVALUACIÓN DEL COSTE DE CAPITAL

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### ABSTRACT

Nowadays, some capital budgeting techniques have been analyzed by investors in order to make investment decisions because risk takers usually evaluate some techniques, such as the return for projects, net present value for forecasted cash flows, the real-time that an investment can be recuperated, finance variables for sensitivity analysis, and cost of equity. Some methodologies exist; the most common ones are Capital Asset Pricing Model (CAPM) and Gordon's Wealth Growth model. So, evaluating the cost of equity is essential for risk analysis, but in recent years, some have written articles about hybrid and avant-garde methods that complement the analysis of cost-of-equity techniques. The research aims to show the importance of applying those methodologies that benefit international investors and finance scientific researchers who strive to develop advances in theories and models for the cost of equity evaluation. The methodology was bibliographic because it was necessary to investigate recent articles about those methods. Articles information was taken from the Web of Science database from 2017-2021. The number of articles selected was based on convenience sampling. The study shows the recent articles that have applied Hybrid and avant-garde methods in evaluating the cost of equity. Also, the purpose of each investigation and the explanation of the use of those methodologies.

**Keywords:** Capital budgeting techniques, cost of equity, Weighted Average of Capital, risk analysis, hybrid and avant-garde methods.

### RESUMEN

Hoy en día, los inversionistas han analizado algunas técnicas de presupuesto de capital para tomar decisiones de inversión porque los tomadores de riesgo generalmente evalúan algunas técnicas, como el rendimiento de los proyectos, el valor presente neto para los flujos de efectivo pronosticados, el tiempo real en que se puede recuperar una inversión, variables financieras para análisis de sensibilidad y costo de capital. Existen algunas metodologías; los más comunes son el modelo de fijación de precios de activos de capital (CAPM) y el modelo de crecimiento de la riqueza de Gordon. Entonces, evaluar el costo de los recursos propios es esencial para el análisis de riesgo, pero en los últimos años algunos han escrito artículos sobre métodos híbridos y de vanguardia que complementan el análisis de las técnicas del costo de los recursos propios. La investigación pretende mostrar la importancia de aplicar aquellas metodologías que benefician a los inversionistas inter-

nacionales y financien a los investigadores científicos que se esfuerzan por desarrollar avances en teorías y modelos para la evaluación del costo de las acciones. La metodología fue bibliográfica porque fue necesario investigar artículos recientes sobre dichos métodos. La información de los artículos se tomó de la base de datos Web of Science de 2017-2021. El número de artículos seleccionados se basó en un muestreo por conveniencia. El estudio muestra los artículos recientes que han aplicado métodos híbridos y de vanguardia en la evaluación del costo de capital. Asimismo, el propósito de cada investigación y la explicación del uso de dichas metodologías.

**Palabras clave:** técnicas de presupuesto de capital, costo de capital, promedio ponderado de capital, análisis de riesgo, métodos híbridos y de vanguardia.

## INTRODUCTION

Investors analyze different finance tools to make an investment decision. Kirby (2019) indicates that capital budgeting techniques can be divided into three categories. The first one is named naive, and this considers the Accounting Rate of Return (ARR), Price-to-Book ratio (PB), and Discounted Payback (DPB). The second one is advanced, considering sensitivity analysis, Internal Rate of Return (IRR), modified IRR, scenario analysis, profitability index, and Net Present Value (NPV). Sophisticated techniques are the last one: Real Options, Game Theory Decisions, Decision Trees, and Capital Asset Pricing Model (CAPM), which are helpful for opportunity cost estimation.

Investors require a rate of return at the time of investment decision, which refers to the opportunity cost for projects, and it is an essential variable for the Weighted Average of Cost of Equity (WACC) (Shimada, 2020). This is also referred to as the opportunity cost to discount Free Cash Flow (FCF) (Wang et al., 2020), in which the mean of risks is weighted, the average after-tax cost of equity, which interest needs to be adjusted for its calculation. The standard methods for cost of capital estimation are Capital Asset Pricing Model (CAPM) and Gordon's Wealth Growth model, but others are not frequently used, such as Arbitrage Pricing Theory (AHP), (2020). Some other methods have been developed that state that CAPM and the three-factor model are inaccurate. Hsieh et al. (2019) consider that companies' growth rates are related to an expected rate of return, so stock prices, capital of shareholders, and earnings predictions into the residual income are taking accounting in this technique, which shows that opportunity cost gets better outcomes at the time of considering the rise on rates.

Recently, many articles have been written about the cost of equity, which includes the analysis of some new hybrid and avant-garde methods that help investors to make financial decisions on projects. So, this research aims to show the importance of applying those methodologies that benefit international investors and finance scientific researchers who strive to develop advances in theories and models for opportunity cost evaluation. Future opportunity cost investigations might be developed with the input of those researchers since there are different purposes and variables that investigators require to analyze when evaluating the impact of the cost of equity. This study opens a window of opportunities for investors and financiers.

## MATERIALS AND METHODS

In this study, bibliographic research was applied since investigators searched for information about the analysis of new hybrid and avant-garde methods that complement the cost of the capital evaluation. Articles information was taken from the Web of Science database from 2017-2021. The selection of articles is based on the search of the last five years and includes all quartiles of the Journal Citation Reports, including the Emerging Sources Citation Index.

The economics, econometrics, finance, and accounting category was selected as an inclusion and exclusion method. A review article, early access, open access, and enriched cited references are included. Likewise, proceeding papers, book reviews, book chapters, editorial material, meeting abstracts, notes, letters, and data papers were excluded.

It was decided to give a consistent triangulation on the definition of high-impact research; each article was checked against the Scopus database, and the articles are in both databases regardless of their research quartile. In this triangulation, there were no inclusion or exclusion criteria, this process being carried out previously.

The search engine is based on "All fields" that includes topic, title, author, publication titles, year published, affiliation, funding agency and publisher. The keywords applied were "Cost of Capital", "evaluation techniques", "evaluation", "evaluation methods", "Cost of Capital AND evaluation", "Cost of Capital AND evaluation techniques", "Cost of Capital AND evaluation methods", "Costo de capital", "técnicas de evaluación", "evaluación", "métodos de evaluación", "Costo de Capital AND evaluación", "Costo de Capital AND técnicas de evaluación", "Costo de capital AND métodos de evaluación", "Kapitalkosten", "Bewertungstechniken", "Auswertung", "Bewertungsmethoden", "Kapitalkosten AND

Auswertung”, “Kapitalkosten AND Bewertungstechniken”, “Kapitalkosten AND Bewertungsmethoden”.

Keywords are incorporated in two languages other than English since the number of investigations in Spanish and German is high for the term of the object of study. This incorporation aims to broaden the spectrum of data and conclusions usually excluded because they are in a language other than English.

## RESULTS

In recent years, some investigations about the cost of capital have been evidenced. Valaskova et al. (2019) developed research about how capital structure can influence company valuation. The principal objectives of this research are to analyze the incidence of financial architecture on the opportunity cost of Slovak organizations and the suggestion of an excellent form to develop a finance decision. Slovakia's Stock Market is poorly developed, so investigators selected seventeen stock companies, excluding commercial banks, because they had different capital structures. To evaluate the dependence between variables, it was necessary the use Pearson correlation coefficient, regression analysis, and Man-Whitney U-test. As a result, it shows that the cost of capital, the company's size, and capital structure have an indirect relationship.

Franek & Kashi (2017) wrote about some new hybrid methods to evaluate the performance of a medium-sized automotive company in the Czech Republic for twelve months in the year 2013. The objective of the investigation was to show a systematic decision-making procedure, which mixes MADM methods, such as Simple Additive Weighting (SAW) and COPRAS-G, with Analytic Hierarchy Process (AHP) in order to analyze the business finance management of a manufacturing organization and value the impact of different weighing methods, such as subjective methods of AHP, objective methods of entropy, and the combination of both of them. The investigators conclude that those new hybrid methods can assess corporate performance.

As a result, it could be identified four areas or uses that investigators can apply to business and finance decision-making with the help of MADM methods. The first is focused on estimating objective, subjective, and relative weights, which can be developed through the method of AHP, which SAW and COPRAS-G complement. The second is to set an order of priorities and established factors, known as strategic alternatives. The third one is useful to calculate the relative priorities chosen alternatives so that managers can make new decisions. The last application of methods is for industry organization analysis.

Rajverma et al. (2019) examined the grade of dependence among capital structure, cost of capital, and dividend, considering a sample of 457 organizations that are not financial companies indexed on India's National Stock Exchange (NSE). The data was obtained from the Centre for Monitoring Indian Economy (CMIE) from 2006 to 2017; the investigation did not include government-owned firms. As a result, it was shown that family firms were dominant because of the evidence of concentrated ownership, and also, the average cost of opportunity cost, leverage, and the dividend was interlinked. These kinds of firms tend to pay lower dividends and have grand debts with reduced opportunity costs. This research applied the 3SLS system approach (Econometric model), so DIV, LEV, and COC models were used in these segments (Wide, family, FAMCON, and whole firms).

Nourali & Osanloo (2019) developed a model related to the regression tree technique to calculate the mining equity cost. The investigators indicate that underestimating this variable could postpone production and construction projects. If it is overestimated, the company's value can be reduced, and other capital cost estimation models in finance evaluation do not forecast it with a reliable range of error. That is why these investigators propose this methodology for the cost of equity estimation. Opportunity cost data of twenty-eight porphyry copper mines were considered for this research. The model introduced two relevant factors: Yearly Ore Output (AOP) and Yearly Rock Output (ARP).

For the validation, it was obtained into consideration of a +/- 10% of error in the construction model and also helpful for estimating the Root-Mean-Square error (RMSE) and Mean Absolute Error (MAE). The first one refers to prediction errors, and the second measures the difference between prediction values and the ones observed, so predicted values taken from the regression tree model, and the estimation of both equations explained before, were necessary for discount rate calculation, showing a reliable model. As a result, it also shows a direct relationship between opportunity cost and AOP, and when ARP and AOP increase, more cost of equity is required for mining activities.

The same authors wrote a similar article in 2019, but the capital cost estimation was obtained with the help of Support Vector Regression (SVR). In that case, data from fifty-two pit porphyry copper mines were necessary for the investigation. However, it was orientated under the supposed that the models of the cost of capital do not forecast mining Capital Expenditure (CAPEX) with a reliable magnitude of the error. After the testing procedure, it

demonstrated that SVR was a form to calculate the return required by investors Nourali & Osanloo (2019).

Zhang et al. (2020) also calculated the cost of capital for mining projects, but in this case through a novel artificial intelligence model and deep neural network (DNN)-based ant colony optimization algorithm (ACO). Seventy-four observations were used for estimation, 22 copper mines from Vietnam, China, Iran, and India, and 52 taken from Copper Mine Project Profiles studied by Zhang et al. (2020). As a result, it is evidenced that through this methodology, the cost of capital can be predicted for open-pit mining projects in a better way than traditional Artificial Neural Networks (ANN), so ACO is considered an important function to improve its accuracy in the model. The variables that investigators took into account for the estimation were MineAP (annual mine production), MillAP (annual production of the mill), SR (Stripping ratio), LOM (life of mine), and RMG (reserve mean grade).

Agasha et al. (2022) analyzed the return investors require in the relationship between loan portfolio quality and capital structure. A cross-sectional design was introduced. The research was focused on Uganda's microfinance institutions (MFIs) and considered a sample of eighty-two of the total population. Partial least squares equation modeling (PLS-SEM) was used in hypothesis studies. The strength of mediation was assessed through Variance Accounted For (VAF).

As a result, it got a percentage of 43,1%, which means that the price of equity partially mediates the relationship between loan portfolio condition and capital structure because the outcome is on the reach of 20% and 80%. It also shows a positive relationship between loan portfolio condition and capital structure, and this tries to explain that if the capital structure has good conditions, it permits the financial institutions to satisfy financial requirements and amend their creditworthiness.

A positive relationship between capital structure and the rate required by investors is evidenced, showing that more financing forces the cost of capital to be higher because of new insurance fees, dividends, and interest payments. Also, the correlation between opportunity cost and loan portfolio quality was positive, indicating that if the first variable increases, it motivates MFIs to give loans, decreasing default rates, which can make that loan portfolio quality can be amended. The investigation suggests rationing credit as a strategy to get repayments faster and also points out the analysis of conditions and terms of funds before making a financial decision.

Hoang et al. (2021) also applied least squares as a methodology that combines the implied cost of capital

(ICC) to predict stock market returns. This study considered firms from the United States listed on NYSE, AMEX, and NASDAQ, focusing on the research from 1976 to 2018. It used the most common ICC models: GLS, CT, OJ, MPEG, and GD.

Ordinary least-squares multiple regression analysis was applied by AlHares (2020) to evaluate the incidence of company management on opportunity cost in Organization for Economic Co-operation and Development (OECD) countries. The study was developed for two hundred corporations from Anglo-American and European republics from 2010-2017. As a result, an undesirable correlation between director proprietorship and governance index was evidenced but showed a positive correlation with block ownership.

Shimada (2020) evaluated the economic outcomes of voluntary disclosure for future investments on the cost of capital of manufacturing companies. The sample reached an amount of 1387 firms and 7144 firm-years, taken from Toyo Keizai Kaisha Shiki Ho. Outcomes demonstrate that the opportunity cost of companies that disclose investment forecasts tends to decrease more than those that do not, so that is why finance information influences an investor's decision-making, affecting Opportunity cost. The cost of capital was estimated through earnings forecasts, suggested by Nekrasov & Ogneva. (2011). The treatment effect estimates model was applied for multivariate tests, where vectors of determinants, year fixed, industry effects, and firm risks are introduced in the model.

A forecast of the cost of equity through the Bayesian approach for photovoltaic and wind energy was studied by Obane (2019), where compounded value was compared with the actual cost in 2017. This research used the cost of equity calculated in the previous article (after 2011) and the cost of capital data from 2015-2017. As a result, it shows that estimation costs through this methodology are accurate if the real ones are in the estimated cost range. It also forecasted the rate required by investors for the year 2030 with the same technique, and it is expected that the opportunity cost will get more significant than the estimated by Japan. It is essential to remember that one to three years must be the observation period in the practical aspect.

Hsieh et al. (2019) wrote about the grade of dependence on the cost of equity and accounting quality when there is a grade of institutional ownership. Stretchy econometric methodology, established on Panel Smooth Transition Regression (PSTR). Hsieh et al. (2019) applied in this investigation, considering sixty-four companies in Taiwan from 2000 to 2017. Usually, to calculate the opportunity

cost is necessary to consider risk costs, but the present study proposition, industry effect, investors' ex-ante evaluation of equity cost, and industry-adjusted EP ratios (dependent variable) were considered. The grade of institutional ownership is named the transition factor. The model was applied to this research, using market risk premium, SMBt, and HMLt, since those variables tend to influence the opportunity cost. It also included the accounting quality variable ( ) and a one-year lag to ensure the information can be available to evaluate risk. The outcomes show that both variables tend to have significant variations if the level of institutional ownership changes.

Hsieh et al. (2019) evaluated similar variables since they focused on the grade of dependence on financial information quality and the rate required by investors. The data was taken from Bucharest Stock Exchange, and the period analysis was from 2012 to 2017, in which financial information was analyzed for fifty-eight companies (384 observations). The outcomes showed that financial information quality significantly contributed to the decrease in the cost of equity. This research applied an econometric model, introducing the following variables WACC quotation: book value equity per year, net income per share at the end of the year, regression coefficients, and random variables. Also, the model was utilized, considering total accruals, change in current assets, change in cash and current liabilities, fluctuation of short-term debts, amortization, and depreciation to display accurate representation.

Gregory et al. (2021) developed an Environmental Social and Governance (ESG) model, considering multi-factors that affect the opportunity cost. The sample corresponds to the period from September 1999-January 2017. Kenneth French's website helped take financial data for twenty-three developed markets in the United States. In order to test the model, it was necessary to use a two-pass regression analysis to determine if sustainability is priced on the company's opportunity. As a result, sustainable strategic plans decrease the opportunity cost by 1.6% to 2.9% per year, encouraging the Gross Domestic Product could increase by \$1.3 to \$2.3 trillion. In other outcomes, it tested that there was a negative grade of dependence between opportunity cost and sustainability.

An article evaluating the relationship between corporate governance and the company's value influenced by investment rules, which has Sarbanes-Oxley (SOX) Act of 2002 approval and stock exchanges requirements. S&P 1500 index was selected for the analysis because of the consolidation of the S&P MidCap 400 index, S&P 500 index, and S&P SmallCap 600 index. This sample does not include small companies' stocks. The study focused on 1999-2005, but the data from 2002 was not included since

the investigation evaluated pre and post-SOX periods. The subtraction between scope and book-to-market briefcase amount-freighted returns and companies' yearly stock returns were practical to get the excess stock returns. As a result, it was found that a change in governance makes the worth of company-tier capital expenses vary.

The Monte Carlos method has been used to analyze high-tech companies' intangible assets, taking into the context of net safety. Sixty companies were chosen for the study, where 30 belonged to information technology and 30 to the manufacturing industry, spanning 2009-2011. The study developed a combination of the Capital Asset Pricing Model (CAPM) and Weighted Average Cost of Capital to get the rate investors require but applied the Analytic Hierarchy Process (AHP) to estimate its weight. As a result, it was discovered that high-tech firms tend to have higher indicators in terms of net assets and accounting surplus, getting excellent outcomes on earnings per share.

They developed an implicit compound price of capital since PEG and MPEG standards were adopted to get the outcome through an average of the methods described before. The study was developed with 6261 Australian company-year observations, considering finance information from 1997 to 2016. It recommends using these cross-sectional model-based earnings when estimating the returns investors require. As a result, earning forecasts tend to have less bias than analyst earnings forecasts. The annual earnings response coefficient (ERC) was necessary for the revision to get the worth-significance of models.

Some studies have been developed about the implicit price of equity, which has not included changing discount rates over time. In studies where time-varying opportunity cost is introduced, investigators are considering a term structure of implicit price of equity instead of research focusing on unvarying implied opportunity cost. Its purpose was to forecast volatilities and future stock returns, being that this model is relevant to get ex-ante earnings announcement premiums. The evaluated years were 1996-2015, and 4897 companies were considered a sample. Data was taken from Chicago Mercantile Exchange, Option Metrics unpredictability shallow, and the zero-coupon liaison file. Besides the estimate of the price of equity, one of the contributions of this paper is that the methodology can be applied to evaluate variations of implied opportunity cost.

The predictable price of capital for the Real Estate Investment Trust (REIT) with a sample of fifty-one REITs from January 1997-December 2014. The following methods were compared: the hybrid beta approach, the

four-element standard, the REIT-element standard by Chen et al. (2012), and five- element standard developed. OLS regressions were used to compare risks. For this analysis, it was necessary to compare outcomes of one month, one year, three years, and five years out of sample forecasting accuracy for all methodologies mentioned before. As a result, it was found that absolute forecast errors are reduced than the other ones with the hybrid beta approach, so the study helps investors choose the best estimation of the cost of capital.

The use of Monte Carlo simulations to develop probability distributions to forecast different scenarios of the value of the Company AMBEV since the investigation aimed to estimate the organization's worth through the reduced currency flow method but incorporating the uncertainty variable of cost of equity. The range data for the investigation was from the year 2013-2017. The stochastic valuation model was developed through Monte Carlo simulations. As a result, it was concluded that it is a good tool for financiers because although it is not possible to forecast the actual value of the firm, it is helpful to analyze risks.

Wang et al. (2020) analyzed the change in the proportion necessary by financiers among U.S. domestic companies and U.S.-based multinational companies. The investigation considered a sampling of 1228 company-year remarks from 1994 to 2013. The results revealed that this last one had a higher equity price and showed that the industry affects outcomes. The price of equity, capital structure, and cost of equity was calculated through Bayesian Markov, using Monte Carlo simulation.

Table 1 shows all the studies carried out as a summary for systematization in decision-making.

Table 1. Summary information about recent investigations.

Target/Range period	Sampling	Method	Investigator
Slovakia Stock Market	17 Stock companies, including commercial banks	Pearson correlation coefficient, regression analysis, and Man-Whitney U-Test for the evaluation of the inter-relationship between variables.	Valaskova et al., 2019.
Business performance of a medium-sized automotive company in the Czech Republic for twelve months in 2013.	A medium-sized automotive company	MADM methods: Simple Additive Weighting and COPRAS-G with Analytic Hierarchy Process (AHP)	Franek & Kashi, 2017.
Non-financial firms are indexed on India's National Stock Exchange (NSE). The data was taken from the Centre for Monitoring Indian Economy (CMIE) from the years 2006 and 2017.	457 non-financial firms	3 SLS system approach (Econometric model). DIV, LEV, and COC models were used.	Rajverma et al., 2019.
Porphyry copper mines with Annual Rock were studied. Capital Cost data was escalated to 2016 American Dollars	Twenty-eight porphyry copper mines	A regression tree-based model. Two relevant factors were introduced in the model: Yearly Ore Output (AOP) and Yearly Rock Output (ARP)	Nourali & Osanloo, 2020
Open-pit Porphyry copper mines with Annual Rock were studied. Capital cost data was escalated to 2016 American dollars.	Fifty-two porphyry copper mines	The estimation of capital cost was based on Support Vector Regression (SVR)	Nourali & Osanloo, 2019 <sup>a</sup> .
The model was developed to estimate the price of capital of 22 copper mines in Vietnam, China, Iran, and India, and 52 taken from Copper Mine Project Profiles studied by [14].	74 Copper mines were studied	Novel Artificial Intelligence model and Deep Neural Network-based Ant Colony Optimization algorithm (ACO) to forecast the cost of capital.	Zhang et al., 2020
Uganda's microfinance institutions	82 Uganda's microfinance institutions	Partial least squares equation (PLS-SEM) and Variance Accounted For (VAF)	Agasha et al., 2022.
Firms from the United States, listed on NYSE, AMEX, and NASDAQ, focus the research from 1976 to 2018.	Firms from the United States	Least squares and Implied Cost of Capital (ICC). GLS, CT, OJ, MPEG, and GD models were applied in the investigation.	Hoang et al., 2021.

Anglo-American and European countries from the year 2010-2017	Two hundred corporations from Anglo-American and European countries	Least squares multiple regression analysis.	AlHares, 2020.
Manufacturing companies in Japanese markets from the year 2004 to 2011	One thousand three hundred eighty-seven firms and 7144 firm-years.	The cost of capital was estimated through the earnings forecasts model. The treatment effect estimates model was applied for multivariate tests.	Shimada, 2020.
The cost of equity calculated in the previous article was used (after 2011), and the cost of capital data from 2015-2017.	Photovoltaic and wind energy capital costs in Japan	Bayesian Approach	Obane, 2019.
Companies in Taiwan from the year 2000-2017	Sixty-four companies in Taiwan	A stretchy econometric methodology based on Panel Smooth Transition Regression (PSTR). Fama & French model was applied in this research	Hsieh et al., 2019.
The data was taken from Bucharest Stock Exchange, and the period analysis was from the year 2012-2017	58 companies (384 observations)	Econometric model (Ohlson, 1995) and (Jones, 1991).	Fallah, 2021
The sample of developed markets (USA) corresponds to the period September 1999-January 2017	23 developed markets	Environmental Social and Governance (ESG) model, considering multi-factors of (Fama & MacBeth, 1973).	Gregory et al., 2021.
The analysis period 1994-2013 of multinational and domestic corporations in the United States.	The investigation considered a sample of 1228 firm-year observations	Bayesian Markov chain Monte Carlo Approach	Wang et al., 2020.

## CONCLUSIONS

In recent s, some investigations about hybrid and avant-garde methods for cost of equity evaluation have been developed in the finance scientific world, benefiting international investors of different sectors and new researchers who wish to provide an advance of theories and models. The published articles have had different purposes, besides the estimate of the prospect cost, such as: Analyzing the correlation among price of capital and capital structure, dividends, corporate governance, voluntary disclosure for future investments, and accounting and finance quality, evaluating interrelationship among poor portfolio quality and capital structure, showing a systematic decision-making procedure, comparing the impact of different hybrid methodologies, forecast a cost of capital with reliable error, predicting stock market returns, estimating the implied cost of equity where investigators can include the criteria of dynamic discount rates, forecasting different scenarios to value a firm, and contrasting cost of equity outcomes from different sectors.

Some of the hybrid and avant-garde methods that have been applied in the last years are: Simple Addictive Weighing and COPRAS-G, Analytic Hierarchy Process (AHP), 3SLS system approach (DIV, LEV, and COC models), regression tree, cost of capital-based con Support Vector Regression (SVR), Novel Artificial Intelligence model, Deep Neural Network-based Ant Colony Optimization algorithm, Partial Least Squares equation (PLS-SEM), Least Squares multiple regression analysis, Accounted FOR (VAF), Implied cost of capital (GLS, CT, OJ, MPEG and GD models), Bayesian Markov chain Monte Carlo approach, stochastic valuation through Monte Carlo simulations, Stretchy econometric methodology, based on Panel Smooth Transition Regression (PSTR), Environmental Social and Governance (ESG), Hybrid beta approach, and REIT factor model.

It has been evidenced in some investigations where they have used the theory of the Fama & French model to include variables that incise the outcomes of cost of equity for industries and organizations. So, taking into account the point that some specific variables also can influence stock returns, it would be interesting that countries of Latin America, where the stock market is not well developed, can consider this model at the time estimating the cost capital since the existence of external causes that investors evaluate for future investments.

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