The Model For Testing Capital Asset Pricing: A Case Study Of Uzbek Companies

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Abstract: The article discusses the scientific and theoretical aspects of using the capital asset pricing model (CAPM) to calculate the value of capital assets in joint-stock companies. It specifically focuses on using CAPM to determine the discount rate for the cash flow of a joint-stock company, based on the income approach of capital assessment. The discounted free cash flows and private equity value of "Kvarts" JSC from 2019 to 2023 were also calculated. Furthermore, the study emphasizes the influence of discounted free cash flows on the future net profit and profitability of the joint-stock business. Simultaneously, experts have formulated scientific and practical guidelines for employing the capital assets approach to assess the capital of joint-stock companies.

Keywords: capital assets, capital value, discounted cash flow, net profit, private equity, profitability .

INTRODUCTION

Currently, the financial market has achieved a new milestone, and the impact of the economic reforms done in the country is favorable. Consequently, this represents the implementation of the capital market development strategy as a viable means of attracting available capital to businesses and the utilization of financial institutions and the surplus resources of the population. Nevertheless, in Uzbekistan, the challenges pertaining to the assessment of financial assets of businesses in the capital market and the valuation of enterprise capital have not been resolved through scientific research or practical means. In light of the changing capital market, it is imperative to enhance the evaluation of enterprise capital worth in our country. Consequently, this enables the application of evaluation criteria from industrialized nations to assess the capital of the joint-stock firm, while simultaneously addressing issues associated with the utilization of the capital assets calculation method.

In the context of changes in the capital market, the calculation of capital assets, tracking the movement of assets in the investment portfolio, evaluating their actual value, analyzing investment opportunities of firms, and making forecasts based on discounted cash flows are utilized. It is evident that the limited use of the capital asset calculation method in evaluating the value of enterprises in our country indicates issues with accurately valuing financial assets, projecting income from these assets, estimating income from the company's investment portfolio, and forecasting discounted cash flows. Nevertheless, global experience demonstrates that the capital asset pricing model is employed to address the aforementioned issues by assessing the investment prospects of the company, the market value of the assets in the investment portfolio, and the discounted cash flows of the company's operations.

Literature review

Following the development of the Capital Asset Pricing Model (CAPM), global scientists are expanding the potential for estimating enterprise capital costs. In addition, scientists worldwide have started implementing alternative models for estimating capital value, employing the financial asset

valuation model known as CAPM. The model developed by William Sharp, known as the Capital Asset Pricing Model (CAPM), relies on the underlying assumptions of the financial assets valuation theory. He stated that the firm demonstrated a method of achieving a higher return for taking on risk, by factoring in risk-free assets (such as anticipated earnings from government bonds and treasuries) when calculating the cost of capital (Sharpe, W. F. 1964).

John Lintner conducted research on the technique of financial asset appraisal and fully embraced the theoretical framework established by William Sharp (Lintner, J. (1975). The study estimated the systematic risk using the beta coefficient and provided commentary on this coefficient as follows: If β_i is greater than 1, then it represents an aggressive security with a systematic risk variable. Conversely, if β_i is less than 1, then signifies a defensive security. This model assumes that financial assets are borrowed at the risk-free rate of return (Gujarati, D. N., & Porter, D. C. 2009). However, they failed to consider the expectation of a quick sale. It is important to mention that the absence of license to sell assets in the short term has minimal effect on the financial asset valuation model (CAPM). From our perspective, upon examining the actual implementation, it is evident that there are no limitations on the sale of assets with a short-term duration. Following widespread adoption of the CAPM model by economists worldwide for assessing a company's capital value, it became evident that the market beta (β) was insufficient in accurately representing the projected return of the capital. Specifically, Robert Merton develops the ICAPM (Intertemporal Capital Asset Pricing Model) in order to address this issue. This model assesses the company's financial assets by considering various time periods for the financial market to achieve balance. In this model, the value of beta (β) is equivalent to the number of additional indicators, and the enterprise's investment is controlled at the chosen moment. The ICAPM model mitigates risk by including factor-specific parameters. R. Merton incorporated the risk premium and the market portfolio into the multivariate regression model, taking into account the need for hedging. The ICAPM model represents risk and expected return through a mathematical function (Merton, R. C. 1973).

This approach minimizes the risk associated with internal changes in the investment portfolio and the decline in the market value of portfolio shares. As a result, the overall portfolio return for the investor serves as a hedge against both the total market risk and the portfolio risk. The correlation between market beta (β) and the investor's whole portfolio serves as indicators that assess the present condition of the stock market, investors' future intentions, and portfolio hedging strategies. This model offers investors an assessment of the market's systematic risk and the anticipated risk variables associated with future investments. Following R. Merton's work, several scientists implemented his paradigm.

In 1976, Stephen Ross expanded upon the financial asset valuation model developed by W. Sharp and J. Linter and introduced the theory of arbitrage financial asset valuation, known as APT (The Arbitrage Theory of Capital Asset Pricing). S. Ross conducted a study on the correlation between the anticipated return on capital of a company and the risk associated with the factor group. He extensively incorporated the factor group into his model to demonstrate the impact of systematic risks, which are not tied to the stock market, on the expected return on assets of the company. According to this concept, risks that are unrelated to the market also have a role in determining the value of the company's assets. Hence, the researcher analyzed the influence of macroeconomic indicators on the capital valuation of the firm, while considering a set of criteria. S. Ross subsequently modified the CAPM model, ultimately determining that only market risk had an impact on the assets of corporations in the stock market. S. Ross utilized this technique to examine a set of variables and identify shared influential characteristics, enabling him to ascertain the anticipated future return on the company's shares. Therefore, the S.Ross model demonstrated its favorable attributes in practical application when compared to earlier models (Ross, S. A. 2013). From a pragmatic standpoint, corporations are dissatisfied with simply investing their unused funds in the stock market. Instead, they seek to utilize these investments to fulfill their present and future consumption needs for services and goods. The investment portfolio has the potential to be used as financial consumption in the future. During the 1980s, the growth of stock markets started to have a substantial influence on the level of investment made by corporations through financial markets, and even had an effect on the monthly returns of stocks. The emergence of CCAPM (consumption-based capital asset pricing model) in the 80s was based on the work of Breeden, Gibbons and Litzenberger.

CCAPM is a model that incorporates consumption as a key factor in pricing capital assets. Their analysis revealed a noteworthy correlation between consumer spending and stock market returns. According to our viewpoint, all variables in the CCAPM model completely depict the investment opportunity curve. However, employing the observation method for empirical study of this model has several challenges (Breeden, D. T., Gibbons, M. R., & Litzenberger, R. H. 1989). In a 1979 study, scientist D. Briden discovered that the variability of per capita consumption growth is directly linked to the risk premium of assets in comparison to the firm's portfolio income. According to this model, when the marginal utility of an extra dollar is high, consumption would drop. Conversely, when the marginal utility of an extra investment is low, rational consumption will be high. This conclusion was reached in reference (Breeden, D. T.1979).

E. Fama and K. French did empirical research on the financial asset valuation model and developed a three-factor financial asset valuation model. The classic CAPM model incorporates two extra variable elements: the change volume component, represented by the company's market capitalization (Market equity) ME, and the ME ratio coefficient. Book equity (BE) refers to the book value of equity capital, which is calculated as the difference between the book value of equity capital and the value of preferred shares. According to their assessment, these indicators can effectively evaluate the systemic risk in the market (Fama, E. F., & French, K. R. 1992).

According to our analysis, the internal factors that influence the financial assets of a company in the context of changes in the capital market include the market index, the market value of companies, the market value of stocks, and the volume of securities traded. External factors encompass several economic indicators such as the exchange rate, interest rates, industrial growth index, inflation rate, and income disparities between long and short-term government bonds.

Research methodology

In our study, we used the method of capital asset calculation (CAPM) to determine the discount rate for the cash flow received by the joint-stock company for private capital based on the income approach of capital valuation of the joint-stock company " Kvarts " in our country. The following formula is used to calculate capital assets.

$$КМАБ = Р_ф + \beta(Бд - Р_ф), \tag{1}$$

Here:

KMAB - value of financial assets of Kvarts JSC;

$Р_ф$ - rate of return on risk-free assets;

β - beta coefficient, where: $\beta = \frac{COV(r_i r_m)}{\sigma_m^2}$, r $_i$ – stock return; r $_m$ - market return; σ ^{2} m is the variance of the market return

Бд- the total profitability of the market (the average rate of profitability in the market).

Using the above formula, the discount rate for the cash flow of " Kvarts " joint-stock company for private capital is found. After that, the value of the private capital of "Kvarts" joint-stock company is found by the following formula.

$$Кк = \frac{КЭПО_1}{(1+ДС)^1} + \frac{КЭПО_2}{(1+ДС)^2} + \cdots + \frac{КЭПО_n}{(1+ДС)^n} \tag{2}$$

Here:

Kq - private equity value of Kvarts JSC;

КЭПО- free cash flow discounted from capital;

ДС - discount rate of capital.

Analysis and results

The value of a joint-stock company's private capital is mostly determined using the method of calculating capital assets. To ascertain the private capital of Kvarts JSC, the free cash flows generated by the capital are calculated over the years, leading to the determination of the enterprise's private capital value. Considering the aforementioned calculations, the cash flow discount rate of "Kvarts" JSC, calculated using the capital cost calculation method, is presented in Table 1 below.

Table 1

Discount rate of the private capital of " Kvarts" joint stock company (2019-2023)[1]

Indicators	2019	2020	2021	2022	2023
Again financing rate according to without risk assets level	16	16	16	16	16
Beta (β) coefficient	1.2	1.3	1.3	1.1	1.0
of the market common profitability level (investment)	20.63	20.63	20.63	20.63	20.63
For market risk reward (investment)	4.63	4.63	4.63	4.63	4.63
"Kvartz" JSC private capital discounting rate	21.6	22.0	22.0	21.1	20.6

According to the information shown in Table 1, the capital cost of "Kvartz" JSC was 21.6% in 2019 and is projected to decrease to 20.6% by 2023. It is important to highlight that the anticipated rate of return on investment is 21.6 percent. The percentage of the investment cost derived from the capital of JSC "Quartz" is also indicated. The financial assets of "Kvarts" JSC had a beta coefficient of 1.2 in 2019, indicating a high level of risk. However, it is expected to decrease to 1.0 in 2023. Consequently, this suggests that the company's shares have a high amount of market risk. Nevertheless, the overall market profitability stands at 20.63 percent, which is directly linked to the elevated risk level in our country. The investment potential of "Kvartz" JSC is significantly reduced by a high degree of market profitability. Furthermore, the risk-free asset level of 14% on the refinancing rate results in "Kvarts" JSC demonstrating an elevated cost of capital, leading to a reduced cost of capital and an increased cost of capital investment.

In summary, the analysis indicates that the capital value of "Kvarts" JSC has a consistent downward trend over time. However, using the risk-free refinancing rate to calculate the value of capital leads to an overestimation of its value. Consequently, there is a rise in the expense of capital investment. The rise in capital worth suggests a high level of risk in the country. The discount rate for the cash flow received from private capital is established through the calculation of capital assets. The value of the private capital of the firm is displayed in Table 2 using the second formula.

Table 2

"Kvarts" joint-stock company private equity value, billion. in soums (2019-2023)[2]

Indicators	2019	2020	2021	2022	2023
Free cash flow discounted from equity	56.6	55.4	55.4	58.2	59.7
Cost of equity capital	409.6	401.0	401.0	420.7	432.1

From the data of Table 2, it can be seen that the discounted free cash flows of Kvarts JSC in 2019 amounted to 56.6 billion. if it was soum, it is expected to grow by 5% by 2023. The main reason for this

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[1]Prepared by the author on the basis of the annual report of " Kvarts " JSC (https://kvarts.uz/)

[2]Prepared by the author on the basis of the annual report of "Kvarts" JSC (https://kvarts.uz/)

is that as a result of the completion of the construction of the new line of " Kvartz " JSC in 2020, the net profit of this enterprise will increase by two or three times in the coming years. Also, we can observe that the reason for the decrease in discounted cash flow from capital in 2020 is that the coronavirus pandemic in our country has affected the volume of glass production, the demand for glass products has decreased the price, and the free cash flow has decreased as a result of the disruption of the logistics system in our country during the quarantine period. In addition, as a result of the joint-stock company's increased obligations related to the construction of a new line, the company's profitability will decrease in the near future. This, in turn, has the effect of lowering the discounted free cash flow from equity for future years. The commissioning of the new line shows that by 2023, free cash flow discounted from capital will increase dramatically. The new float line will produce up to 22.2 million square meters of flat glass per year. To implement the plans, the capacity of the glass melting furnace will be increased to 400 tons per day. This volume fully covers Uzbekistan's domestic need for high-quality flat glass, and gives the opportunity to export the product.

To summarize, "Kvarts" JSC is the primary catalyst for the appreciation of private capital, resulting in the rise of discounted free cash flow. The inclusion of the discount rate is essential in calculating the capital value of a joint-stock firm. Furthermore, it is recommended to utilize the capital assets calculation method for computing the discount rate.

Conclusions

According to the findings of the aforementioned research, our conclusions and recommendations are to utilize the capital asset pricing model (CAPM) for assessing the capital worth of the company. comprises:

Initially, it is imperative to align the criteria employed by industrialized nations when evaluating the financial worth of businesses within our country. Consequently, it helps mitigate the financial risk faced by businesses, foster effective corporate governance, cultivate a strong corporate culture, align national accounting rules with worldwide accounting standards, and enhance the sovereign rating of the country.Utilizing the refinancing rate results in an increased anticipated return on the enterprise's capital and effectively restricts the capital investments of both international and domestic investors.

Furthermore, the discount rate for the cash flow received by the joint-stock business should be determined using the capital asset pricing model (CAPM) according to the income methodology for valuing the company's capital. Consequently, it became feasible to ascertain the anticipated revenue and systemic risk of joint-stock enterprises funded by private money, and to align national valuation standards with the principles of international valuation standards.

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