Risk Analysis in Capital Budgeting: Understanding and Mitigating Financial Uncertainties

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After-Tax Cost of Debt

Yield to maturity on PCI's long-term debt: 9%

Tax rate: 25%

After-Tax Cost of Debt=Yield to Maturity×(1−Tax Rate)

=0.09×(1−0.25)

=0.09×0.75

=0.0675

Therefore, the after-tax cost of debt for PCI is 6.75%.

Cost of Preferred Stock

Dividend per share: $9

Price per share: $100

Flotation costs per share: $5

Cost of Preferred Stock= Dividend /(Price per Share−Flotation Costs per Share)

Cost of Preferred Stock=9/(100−5) 0

=9/95

=0.0947

Therefore, the cost of preferred stock for PCI is approximately **9.47%.**

Cost of Common Stock

a. CAPM Method:

Risk-free rate (*Rf*): 6%

Beta (β): 1.3

Market return (*Rm*): 11%

Cost of Equity (Re)=*Rf*+*β*×(*Rm*−*Rf*)

Cost of Equity (Re)=0.06+1.3×(0.11−0.06)

=0.06+1.3×0.05

=0.06+0.065

=0.125

Therefore, the cost of common stock using CAPM is 12.5%.

b. Dividend Growth Method

Dividend per share (D0): $3.70

Growth rate: 6%

Stock price: $60

Cost of Equity (Re)= $\left\{\left(\text{Dividend per Share (D0)}\times(1+\text{Growth Rate})\right) / \text{Stock price}\right\} + \text{Growth rate}$

$=\{(3.70\times1.06)/60\}+0.06$

$=0.06537+0.06$

$=0.12537$

≈ 0.125

Again, the cost of common stock using the dividend growth method is **12.5%.**

Weighted Average Cost of Capital (WACC)

optimal capital structure percentages:

- Debt: 30%
- Preferred stock: 10%
- Common stock: 60%

WACC = Weight of Debt × After-Tax Cost of Debt + Weight of Preferred Stock × Cost of Preferred Stock + Weight of Common Stock × Cost of Common Stock

WACC = 0.3 × 0.0675 + 0.1 × 0.0947 + 0.6 × 0.125

= 0.02025 + 0.00947 + 0.075

= 0.10472

Therefore, the company's weighted average cost of capital (WACC) is approximately **10.47%.**

Factors Management Cannot Control:

Market Risk Premium: It is the risk premium demanded by investors for bearing extra risk in investment over and above the risk in risk-free assets (Abugre, 2023). In other words, this relates to the overall market conditions, investor sentiment, and other general macroeconomic factors. PCI management cannot directly impact or control the market risk premium.

Risk-Free Rate: The cost of equity, both derived through the Capital Asset Pricing Model (CAPM) method and other derived methods, has the inclusion of the risk-free rate (Abugre, 2023). This is most often the government yield bond, which very well reflects the macroeconomic factors and central monetary policies. PCI's management cannot control changes in the risk-free rate.

Beta: Beta is a measure of how much a stock's return reacts against market movements. It shows the amount of swinging probable, which concerns the value of stock about movement in the overall market. Beta is deduced from historical stock price information and represents the perception that the market has for the risk borne by the company. PCI management would be in a position to get direct control over its beta. The latter tend to be swayed by market forces and investor feelings.

Factors Management Can Control

Capital Structure: PCI's management can suitably make changes in the capital structure in deciding the proportion of debt, preferred stock, and common equity to finance the operations of the company (Saylor Academy, n.d.). Management can optimize the capital structure so that the weighted average cost of capital (WACC) is minimized through selecting inexpensive sources for funds.

Dividend Policy: The PCI dividend policy pursued brings an implication to its cost of equity. Management may, in a way, affect company risk and growth perception by investors through a change in

the dividend payout ratio or the dividend growth rate (Saylor Academy, n.d.). A consistent and appropriate dividend policy can help attract investors and reduce the cost of equity capital.

Investment Decisions: The decision of management regarding capital investment projects affects the cost of capital in the company (Saylor Academy, n.d.). PCI, therefore, can lower its cost of capital through careful screening and selecting projects with higher expected returns and lesser risk profiles. Effective investment decision enhances the profitability and overall financial performance of the company, hence reducing the perceived risk by the investors.

Investment Options Analysis

Payback Period and Profitability Index

Machine A:

Payback Period:

Initial Investment/Annual Cash Flow

= 50,000/25,000

= 2 years

Profitability Index (PI):

Initial Investment / Present Value of Cash Flows

= (25,000+20,000+10,000+5,000+5,000)/50,000

= 1.7

Machine B:

Payback Period = Initial Investment/Annual Cash Flow

=50,000/15,000

=3 years

Profitability Index (PI) = (15,000+15,000+15,000+15,000+15,000)/50,000

= 1.5

Net Present Value (NPV) and Internal Rate of Return (IRR)

Machine A:

NPV = $25,000 / (1+0.1)^1 + 20,000 / (1+0.1)^2 + 10,000/(1+0.1)^3 + 5000 / (1+0.1)^4 + 5000 / (1+0.1)^5 - 50,000$

= $ 4,305.62

IRR: Approximately 12.11%

Machine B:

NPV = $15,000 / (1+0.1)^1 + 15,000 / (1+0.1)^2 + 15,000/(1+0.1)^3 + 15,000/(1+0.1)^4 + 15,000 / (1+0.1)^5 - 50,000$

= $ 3,305.62

Major types of risks relevant to capital budgeting

Three major types of risks relevant to the capital budgeting decision are Standalone risk; Market/economic risk; and, Project-specific risk. Stand-Alone Risk: It is concerned with the uncertainty bound to occur in the cash flows of a particular investment project independently, i.e., independent of the other ventures of the firm.

The firm's business risk includes those factors where the fluctuations relate to the earnings, costs, and other cash inflows and outflows related to the project. This, therefore, is a risk that should be duly appreciated critically since they impact directly on the financial performance and, hence, the general viability of the project. Stand-alone risk is normally measured with statistical tools regarding the standard deviation and coefficient of variation. Standard deviation measures the dispersion of the mean of cash flows and indicates how volatile the project would be. On the other hand, the coefficient of variation compares the standard deviation to the mean and hence gives a relative measure of risk-adjusted by the project's expected return.

The economic risk, market or economic, is defined as the impact of the external influences on the cash flows, which in this case includes the general economic conditions, market dynamics, interest rates, and inflation rates that are generated from the investment. Again, it is from these external variables that the project's profitability and success are affected (Abugre, 2023).

There are sensitivity analysis and scenario analysis among the relatively common methods. It provides the analysis of the project's sensitivity to the changes in the key economic project factors; it varies the key economic project factors and researches the effect of sales volumes or input costs on the respective financial flow of the project. Scenario analysis will consider all the possible scenarios of the future economic conditions—from the most optimistic one to the most pessimistic one—to define the project flexibility and potential outcomes under the given circumstances.

On the other hand, project-specific risks refer to those risks that are directly linked with a given project, including the possibilities of technical difficulties, shifts in regulations, interference with the supply chain, and finally, unexpected incidents (Saylor Academy, n.d.). Such risks can bring about direct influence over time, costs, and actual success of the project itself or indirectly by affecting the top management. The applied methods include the risk related to projects: the risk-adjusted discount rates and certainty equivalents.

Accordingly, discounting at a rate adjusted for the specific level of project risk would result in more proper estimation of the project's net present value (Abugre, 2023). Certainty equivalents help in quantifying how much risk is being added by these additional project-specific risks. They convert uncertain cash flows into equivalent certain cash flows, where the risk has been added in them because of the project-specific risk, making better comparisons and decision-making.

After an in-depth analysis of all these three kinds of risks, firms would be in a position to make informed decisions when it comes to capital budgeting and also take adequate measures so that the

chance of pits for these firms is reduced while the possibility for favorable investment outcomes increases.

Conclusion

In conclusion, risk analysis plays a critical role in capital budgeting decisions by guiding the company through uncertain times and enabling it to make sufficiently informed investment decisions. Thus, they will offer insightful information about the possible obstacles and advantages for the investment project based on a thorough assessment of stand-alone risk, market/economic risk, and project-specific risk. According to this viewpoint, the measurement of these risks and their modifications might be achieved by efficiently measuring the risk variables through the use of a variety of analytical methods and instruments, including sensitivity analysis, standard deviation, and risk-adjusted discount rates. Ultimately, the company will be able to maximize returns, improve decision-making, and optimize investment plans while significantly lowering the possibility of negative effects on financial performance if risk analysis is incorporated into the capital budgeting processes.

Reference

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