

Capital Budgeting analysis

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Introduction

Business organizations face specific financial decisions during their operations. Most of these decisions are related to the costs associated with the financing options related to different projects. There are two major forms of financing options available to the business, namely debt, and equity. Sometimes, the organization is forced to bring in the finances from the creditors, whereas in some other cases, the new shareholders receive the finances. The purpose of financing can be to increase the business's working capital or raise a source of emergency funding. Debt and equity are the two major methods of raising the required funds for the organization. Each method carries its own positives and negatives, so a particular business needs to consider its own circumstances and decide on the best source of financing.

Debt financing is a very familiar source of financing because almost every individual may have to get a loan at least once in their life. A typical loan has to be paid back in monthly instalments. The business loan will be much similar to the personal loan as interest will have to be paid on both loans. The business loan will involve a higher amount and will be scrutinized more deeply. The major positive aspect of using debt financing is that the owners do not have to lose control over the business's operations. The creditors under traditional debt financing will not have any control over the business's operations. The business will use all the decisions to use the amount received from the debt as intended. Another positive aspect of debt financing is that once the complete payment of the debt has been made, there is no further liability related to the loans. If a line of credit is maintained with a bank, the business can withdraw and deposit the amount at will. In the current scenario, the business has taken the loan in the form of bonds that are long-term debt instruments. The business will have to pay the interest on the bonds in the form of semi-annual installments. The final positive aspect related to the debt for business is the possibility of tax deduction. Taking more debt will result in higher tax deductions affecting the business's net profit as it grows.

The most important disadvantage of debt financing is that it requires repayment, irrespective of the business's current position. As a result, the business may not be earning higher profits initially, but it has to pay the monthly installments.

The major positive aspect of equity financing is that there is no fixed repayment to be made on it. The only payment made to the shareholders is a small percentage of net profit in the form of dividends. The major negative aspect of equity financing is that the shareholders can directly oversee the operations through a board of directors.

Due to the respective pros and cons of debt and equity, businesses generally use a combination of both. Additionally, none of the finance sources come for free, and a certain cost is associated with debt and equity. The cost of debt is represented with K_d , and the cost of equity with K_e . In the current scenario, Variety Enterprises Corporation is evaluating an expansion through a variety of financial concepts (Meric et al., 2010). Therefore, it is important to assess the data to see whether the company can take on a particular project or not.

WACC

The weighted Average Cost of Capital is calculated by multiplying the weight of the finance source by the respective cost. Thus, the percentage weight of equity will be multiplied by the cost of equity, whereas the percentage weight of debt will be multiplied by the respective cost of debt. The following table shows the weights of different financing sources in the business's capital structure.

VEC's Current Market Value optimal Capital Structure		
	Amount	Weight
Bonds	\$ 30,000,000	29.98%
Preferred Stock	\$ 10,000,000	9.99%
Common Equity	\$ 60,080,000	60.03%
Total Market Value	\$ 100,080,000	100.00%

Table 1: weights of different sources of financing

The above table shows that the company is heavily dependent upon common equity as the source of financing. The preferred stock has the lowest percentage out of all the financing options.

The second component of the assessment is calculating the cost of all the financing components. The following table shows the inputs required to calculate the debt cost and the output of calculations.

SEMI-ANNUAL BASIS				
30		\$ (1,085.59)	\$ 45.00	\$ 1,000.00
N	I/Y	PV	PMT	FV
	4.00%	--> SEMI-ANNUAL		
	8.01%	ANNUAL		

Table 2: The cost of debt

The above table shows input and output for the calculation of the cost of debt for the business. The coupon or interest payment on the bond will be twice a year or semi-annually. Thus, the total number of periods will be 30. The current market value of the bond is \$ 1085.59, which is considered the present value in the analysis. The semi-annual payment is \$ 45, and the amount to be received at bond maturity will be \$ 1000, which is also the face value of the bond (Menifield, 2021). Therefore, the semi-annual cost of debt is 4%, which is multiplied by 2 to get the annual cost of debt.

The following formula can be used to ascertain the cost of preferred stock:

$$\begin{aligned}
 \text{Cost} &= \text{Dividend/Market value (Kimmel et al., 2019)} \\
 &= 9/102 * 100 \\
 &= 8.82\%
 \end{aligned}$$

The cost of capital has to be calculated by using the CAPM equation as follows:

$$\begin{aligned}
 K_e &= \text{Risk-free rate of return} + \text{beta} * \text{market risk premium (Shukla \& Grewal, 2018)} \\
 &= 0.05 + 1.2 * 0.05 \\
 &= 11\%
 \end{aligned}$$

From the discounted cash flow approach, the following formula will have to be applied to calculate the cost of capital:

$$\begin{aligned}
 &(d_1/p) + g \text{ (Atrill \& McLaney, 2015)} \\
 &= (1.05/19.08) + 0.05 \\
 &= 10.5\%
 \end{aligned}$$

The bond-risk premium method requires the addition of market risk premium and the cost of debt. Thus,

$$\begin{aligned}
 &= 8.01\% + 5\% \\
 &= 13.01\%
 \end{aligned}$$

The actual cost of equity will be an average of all three methods shown above. Thus,

$$\begin{aligned}
 &(13.01\% + 10.5\% + 11\%)/3 \\
 &= 11.5\%
 \end{aligned}$$

Now that the costs and weights of all finance sources have been ascertained, they have been summarized in the following table.

Capital Structure	Weight	Cost
Debt	29.98%	8.01%
Preferred Stock	9.99%	8.82%
Common Equity	60.03%	11.50%

Table 3: Weights and costs of finance sources

The weighted average cost of capital can be calculated as follows:

$$\begin{aligned}
 &= 29.98\% * 8.01\% + 9.99\% * 8.82\% + 60.03\% * 11.5\% \\
 &= 9.23\%
 \end{aligned}$$

Thus, the final cost of capital will be 9.23% for the business.

Applying the capital budgeting techniques

Capital budgeting techniques include the Net Present Value (NPV), Internal Rate of Return (IRR), payback period, discounted payback period, and the Modified Internal Rate of

Return (MIRR) (Walter et al., 2015). The net present value is the difference between the present values of cash inflows and outflows of the project. The initial outflow is \$ 300000, which is also the depreciable basis for the machinery. For the calculation of cash inflows, the Net Operating Working Capital (NOWC) has to be calculated, which is given to be 15% of sales. The following table shows the current scenario's unit cost, price, number of units, and sales.

Annual Revenue & Cost Estimates (assume 3% inflation rate)				
	Year 1	Year 2	Year 3	Year 4
Units	1,500	1,500	1,500	1,500
Unit Price	\$ 250.00	\$ 257.50	\$ 265.23	\$ 273.18
Unit Cost	\$ 150.00	\$ 154.50	\$ 159.14	\$ 163.91
Sales	\$ 375,000.00	\$ 386,250.00	\$ 397,837.50	\$ 409,772.63
Costs	\$ 225,000.00	\$ 231,750.00	\$ 238,702.50	\$ 245,863.58

Table 4: Unit costs and prices with sales and total costs

To make reliable forecasts, the organization should take the rate of inflation into account. Thus, the costs should be increased based on the rate of inflation.

The total costs and the value of NOWC will have to be deducted from the sales to calculate the cash inflows, as shown in the following table.

Net Operating Working Capital (NOWC) Requirement:						
	Investment	Year 0	Year 1	Year 2	Year 3	Year 4
Sales			375,000	386,250	397,838	409,773
NOWC			\$ 56,250.00	\$ 57,937.50	\$ 59,675.63	\$ 61,465.89
CF		\$ 300,000.00	\$ 93,750.00	\$ 96,562.50	\$ 99,459.38	\$ 142,443.16

Table 5: Cashflow calculations

NPV

The Weighted Average Cost of Capital calculated in the previous section will be used as a discount base to calculate the NPV. Thus, the final value will be \$ 43153. The following formula has been applied to calculate the net present value.

$$\begin{aligned}
 & 93750 / (1+0.0923) ^1 + 96562.5 / (1+0.0923) ^2 + 99459.38 / (1+0.0923) ^3 + 142443.16 / (1+0.0923) ^4 - 300000 \\
 & = 93750 / (1.0923) + 96562.5 / (1.1931) + 99459.38 / (1.3032) + 142443.16 / (1.4235) - 300000
 \end{aligned}$$

$$= 85828.07 + 80934.12 + 76319.35 + 100065.44 - 300000$$

$$= \$ 43153$$

IRR

The IRR is the rate at which the NPV is zero. In other words, the present value of the inflows and outflows will be equal to each other. The calculations reveal that the IRR will be 15.21%.

Payback Period

The payback period is negative, meaning that the project may not be able to recover the actual cash outflows within the given time frame.

MIRR

The MIRR assumes that the funds can be reinvested on the discount rate, i.e., WACC. The calculations reveal that the value of MIRR is 12.96%.

The NPV method of capital budgeting is superior to other capital budgeting methods because it provides a specific amount as an output instead of mere percentages. Thus, the entity can have a solid base to decide whether to take up the project or not. In the current scenario, the NPV for the project is a positive number, which means that the present value of inflows is higher than that of the outflows. Thus, the project should be taken up by the organization. The IRR is 15.21%, which is higher than the cost of capital, showing that the company should take up the project.

Sensitivity analysis

This aspect reveals what could happen in the business's best, base, and worst-case scenarios. The probabilities of 20%, 50%, and 30% have been given to the occurrence, respectively. The following table shows the results for these scenarios related to WACC, NPV, and IRR.

PROBABILITY DISTRIBUTION				
SCENARIO	PROBABILITY	WACC	NPV	IRR
BEST	20.00%	8.23%	\$ 74,890.02	18.17%
BASE	50.00%	9.23%	\$ 43,153.48	15.21%
WORST	30.00%	10.23%	\$ 12,959.73	12.11%
RESULT		9.33%	\$ 40,442.66	14.87%

Table 6: Results of Sensitivity Analysis

The above calculations have been finalized based on the following tables.

Worst-case scenario

Annual Revenue & Cost Estimates (assume 3% inflation rate)				
	Year 1	Year 2	Year 3	Year 4
Units	1,500	1,500	1,500	1,500
Unit Price	\$ 250.00	\$ 231.75	\$ 238.70	\$ 245.86
Unit Cost	\$ 150.00	\$ 139.05	\$ 143.22	\$ 147.52
Sales	\$ 375,000.00	\$ 347,625.00	\$ 358,053.75	\$ 368,795.36
Costs	\$ 225,000.00	\$ 208,575.00	\$ 214,832.25	\$ 221,277.22

Table 7: Sales forecasts for the worst-case scenario

The above table shows the worst-case scenario for the company. The sales will decrease by 10% each year, along with the costs. The following table shows the calculations of the cashflows required to calculate the NPV and IRR.

Net Operating Working Capital (NOWC) Requirement						
	Investment	Year 0	Year 1	Year 2	Year 3	Year 4
Sales			375,000	347,625	358,054	368,795
NOWC			\$ 56,250.00	\$ 52,143.75	\$ 53,708.06	\$ 55,319.30
CF		\$ (300,000.00)	\$ 93,750.00	\$ 86,906.25	\$ 89,513.44	\$ 132,198.84

Table 8: Worst-case scenario for capital budgeting

The resulting figures for the worst-case scenario are much lower than the best-case and base scenarios. The company has set a probability of 30% for the worst-case scenario.

Best-case scenario

The following tables show the best-case scenario for the organization in terms of sales and NOWC.

Annual Revenue & Cost Estimates (assume 3% inflation rate)				
	Year 1	Year 2	Year 3	Year 4
Units	1,500	1,500	1,500	1,500
Unit Price	\$ 250.00	\$ 283.25	\$ 291.75	\$ 300.50
Unit Cost	\$ 150.00	\$ 169.95	\$ 175.05	\$ 180.30
Sales	\$ 375,000.00	\$ 424,875.00	\$ 437,621.25	\$ 450,749.89
Costs	\$ 225,000.00	\$ 254,925.00	\$ 262,572.75	\$ 270,449.93

Table 9: Sales in the best-case scenario

The above table shows the assessment of sales in the best-case scenario. The change in sales and cost from the first to second year has been 13.3%, whereas an increase of 3% has been assumed thereafter. The NOWC for the best-case scenario is shown in the following table.

Net Operating Working Capital (NOWC) Requirement						
	Investment	Year 0	Year 1	Year 2	Year 3	Year 4
Sales			375,000	424,875	437,621	450,750
NOWC			\$ 56,250.00	\$ 63,731.25	\$ 65,643.19	\$ 67,612.48
CF		\$ (300,000.00)	\$ 93,750.00	\$ 106,218.75	\$ 109,405.31	\$ 152,687.47

Table 10: NOWC for the best-case scenario

The above table shows the NOWC and cash flows for the best-case scenario. Since the cashflows are much higher in this scenario, the NPV and IRR are also higher. However, the lowest probability has been given to the best-case scenario, which means that the company is not very sure that this scenario will be practical enough.

Recommendation/Solution

The current analysis has been undertaken to assess the capital budgeting options for Variety Enterprises Corporation. The major recommendation is that the business should take up the project because the NPV is a positive number. Thus, the business is getting more cash from the project than it is spending on the project. The IRR is also higher than the cost of capital for the business, meaning that the business will spend less on the project and receive more. Thus, from both perspectives, the organization should take the project on.

References

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