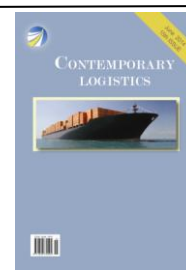




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Errors of Financial Decision-making in Debt Financing Investment Project and the Countermeasures

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KEYWORDS

Debt financing,
Investment project,
Financial decision-making,
Borrowing costs

ABSTRACT

While debt financing has become the main sources of funding of general corporate investment project, the author analyzed the cash flow of debt financing investment project, and suggested enterprises make financial decision by further using net present value method and internal rate of return method. Different from the disposal of total investment hypothesis, investment project analysis should take the influence of borrowing costs on tax bearing, discount rate and others into full consideration. The collaboration and interaction of financing and investment decision making should be practically ensured by combining finance with accounting, and theory with practice, so as to solve the inefficiency issues existing in investment and financing decision making.

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1 Introduction

In practice, net present value method and internal rate of return method are used to evaluate the financial feasibility of investment project usually, however, existing literature and theory had evident difference in terms of cash flow analysis and financial decision-making of debt financing investment project, which caused the difficulty to guide and even misled the practical field to make decision scientifically by using net present value method and internal rate of return method. Nowadays, loan has become the main sources of funding of general corporate investment project, correct analysis of financial feasibility of debt financing project is a big problem for the theoretical cycle and the practical field to solve, without an effective solution yet.

For example, a company successfully developed a kind of core technology for producing a new generation of video electronics, optical engine technology, prepared to build a production line which produces new-type optical engine equipment. It was predicted the project had a construction period of two years, with an investment of 5 million yuan for the project initiation, and an additional investment of 10 million yuan in the beginning of the second year. After the project was constructed and put into production, a supporting circulating fund of 1 million yuan should be invested in a lump sum in the second year, which can be returned fully while the project was scrapped. The project could operate effectively for 5 years, with sales revenue of 7 million yuan unattained each year and out-of-pocket cost of 2.4 million yuan excluding financial cost. It should take back scrap value of fixed assets of 2 million yuan while it is scrapped. Fixed assets was depreciated on the basis of straight-line method, the income tax rate applicable to the company

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was 25%. Suppose the project had a shareholder investment and a bank special loan of 7.5 million yuan respectively, the bank loan had a term of 7 years, an annual interest rate of 6%, the interest accrual should be made at the end of each year, the principal should be repaid with interest in a lump sum when it becomes due. The one-year rate of current period bank deposit was 2%, and the rate of return expected by shareholders was 19.5%.

So, should the loan interest accrued from corporate financing be capitalization or expenditure? Should loan interest have any influence on the entry value of fixed assets? Should interest and depreciation have the role of “tax shield”? How should loan cash flow match the project cash flow? How should a company make a financial decision on debt financing investment project? Here, based on the analysis of the particularity of debt financing investment project, we would like to discuss on the financial decision-making method of debt financing investment project through specific application of the above case.

2 Particularity of Debt Financing Investment Project

2.1 Matching of loan cash flow and project cash flow

2.1.1 Time-point and period

In order to conveniently make use of the form of time value of money, the value indexes which are involved in project investment decision making should be processed as time-point indicators. Among them, if the construction investment occurred in the beginning or the end of relevant year of the construction period, the circulating fund should occur at the end of the construction period; the confirmation of income, cost, amortization, profit, tax etc. of each year in the operating period should occur at the end of the year; the cash flow generated by eventual scrap or liquidation of newly-built project should all occur at the terminal node.

Debt financing investment project should put emphasis on the matching of loan cash flow and project cash flow in terms of period and time-point, so as to ensure the accommodation of funds. Generally, the loan term of debt financing investment project has the same calculation period as investment project; the input of loan and shareholders' funds were all at the construction period, with the same investment ratio; there was no investment in production and operating period; the loan interest could be repaid by the cash flow which would be confirmed at the end of the year.

2.1.2 Pre-tax and after-tax

In general, from the prospective of total investment, shareholders' funds is a kind of investment, and shareholders need to make a profit through investment; while creditors' funds is also a kind of investment, creditors need to gain interest through investment. However, a company could not put all of their money into one project, therefore, it only thought about the movement of all the investment while confirming the cash flow of investment project, but no distinguishing self-possessed funds from loan funds, even treated the funds borrowed as self-possessed funds and disposed of them as cash flow only.

Nevertheless, from the prospective of project, debt financing and project investment are closely tied. Creditors need to gain interest from the project, and the investors need to make a profit from it. When it comes to the project feasibility, the inflow and outflow of loan cash must be considered. Therefore, loan interest would influence current profit and loss, which should be deducted before tax; meanwhile, net cash flow should be adjusted again for calculation on the basis of net profit by combining with cash payment and non-cash payment of interest.

2.2 The Influence of capitalized interest on tax benefits of depreciation

According to the provisions of *Accounting Standards for Business Enterprises*, the loan interest generated when a company purchased and constructed fixed assets, the loan interest that meets the conditions of capitalization in the period of that should be capitalized. Therefore, capitalized interest forms the entry value of fixed assets, without any impact on current profit and loss. Within the serviceable life of fixed assets, capitalized interest appears in the form of depreciation, which will increase the cost and reduce current profit, so that the income tax expense will be less. It plays a role of “tax baffle” to some extent.

What calls for our attention is, capitalized interest amount of borrowing costs was not equal to the interest occurred actually in current period. Based on the difference between special loan and general loan, the capitalized interest amount of special loan should be the balance that the actual interest occurred in the period of capitalization deducted the current deposit interest of loan funds or temporary investment income, and that of general loan should be the result that weighted average of cumulative capital expenditures multiplied by the capitalization rate.

In the case, the loan interest of the project with a construction period of two years met the conditions of capitalization, so: the capitalized interest of borrowing costs = $750 \times 6\% \times 2 - 500 \times 2\% = 80$ (ten thousand yuan), the amount should be accounted for as the original value of fixed assets, and not entered into account as “financial expenses” during the construction period.

2.3 The influence of capitalized interest on cash flow

For accounting treatment of the borrowing costs incurred by a company, besides those can be directly attributable to assets purchase or production that meets the conditions of capitalization should be capitalized, other borrowing costs should be confirmed as expenses and accounted for as current profit and loss according to its amount while it is incurred. Expenditure interest should neither constitute asset value, nor does to be treated as do non-out-of-pocket expense completely. The influence of borrowing costs on cash flow should be confirmed according to different ways of paying interest.

Based on the way of paying interest by installments, interest should be paid by installments. Here the interest is a kind of out-of-pocket expenses, on one hand, it forms cash after paying the interest and flows out, and on the other hand, it becomes expense which made the profit reduced. Therefore, while calculating net cash flow on the basis of net profit, interest should be not the adjustment item. That is to say, net cash flow of operating period in a year = profit of the year + depreciation of the year + amortization of the year + recovery of the year.

Based on the way of repayment of the principal with interest in a lump sum when it becomes due, interest should be incurred on time and paid while it becomes due. For provision by installment, interest should be non-out-of-pocket expense; while calculating net cash flow of current period on the basis of net profit, it should be the item to be adjusted for increase; when it comes to the interest date, the payment of interest should be treated as cash outflow. That is to say, net cash flow of operating period in a year = profit of the year + depreciation of the year + amortization of the year + annual interest withdrawn in the operating period + interest actually repaid in the operating period + recovery of the year.

In the case, since the loan interest in the operating period failed to meet the conditions of capitalization, it should be expenditure and accounted for as current profit and loss. As interest accrual of loan is made at the end of each year, and the principal should be repaid with its interest in one lump sum, the interest incurred from the first year to the sixth year in the operating period should be financial expenses to reduce current profit, but not to be the adjustment item of net cash flow calculated by net profit; the interest in the seventh year in the operating period, on one hand, will have an influence on pre-tax profit, on the other hand, will be used to adjust net cash flow by the balance between the annual interest withdrawn and the actual interest repaid.

3 Evaluation of Financial Feasibility of Debt Financing Investment Project

3.1 Selection of evaluation methods

Since the conclusion of financial evaluation is an important basis for decision making of feasibility study of the construction project in early stage, the specific analytical methods adopted by it will be significant standard for decision making to select different schemes. At present, net present value method and internal rate of return method are the common evaluation methods of project investment.

3.1.1 Net present value method

Net present value refers to the balance by subtracting the cash flow which is discounted as present value which is put into use by the investment project according to the capital cost or the rate of return required by the company from the initial investment. Its formula is:

$$NPV = \sum_{t=0}^n NCF_t / (1+i)^t$$

Net present value method has an advantage of taking time value of money into consideration, which can reflect the economic benefit of the whole life cycle of the project comprehensively and completely. Its disadvantages are: first, the amount of net present value is related to base earnings ratio of the industry or the set discount rate. If the discount rate set is improper, the feasible project might become infeasible project, or vice versa. Second, financial net present value is an absolute number, which can only reflect its favorableness of the project proposed, but cannot reflect the actual profit level of it, so it is not suitable for the comparison of several repelling programs.

3.1.2 Internal rate of return method

Internal rate of return method, also called IRR, is the discount rate that makes the net present value of investment project equal to zero. Its formula is:

$$\sum_{t=0}^n NCF_t / (1+IRR)^t = 0$$

In the formula, IRR refers to internal rate of return.

Internal rate of return reflects the investment income level of the project itself and the economic benefit of the whole life cycle of the project dynamically, compressively and completely. For a project with multiple investment programs and transformation and renovation at the same time, we can evaluate its merits and demerits by calculating the internal rate of return of each program. However, under specific circumstances, internal rate of return might have more than one result, which will cause inconsistency between the assumption of return on reinvestment and the reality.

3.2 Estimate of relevant cash flow

Net cash flow from operating activities refers to the balance between cash inflow and outflow from operating activities. For project evaluation, from the prospective of total investment, net cash flow from operating activities = net operating profit less adjusted taxes + non-out-of-pocket cost + recovery of the year. However, according to the characteristics of debt financing investment project, the borrowing costs will be compensated by the project investment, so, from the prospective of project, net cash flow from operating activities = net profit + non-out-of-pocket cost + recovery of the year. As the nature of amortization is consistent with depreciation, recovery refers to the scrap value of fixed assets recovered at the end of the project and the advanced payment of circulating fund previously. Suppose the project investment had no other long-term assets besides fixed assets, without considering the recovery at

terminal node, but only investigating other normal operating years except the terminal year, the above formula changes into: net cash flow from operating activities = net profit + interest + depreciation. In that way, is it correct to calculate the net cash flow from operating activities of normal years during operating period by “net profit + interest + depreciation”?

Net cash flow from operating activities and net present value of the project are calculated by entity cash flow method, namely to confirm the influence of the project on the company’s cash flow by taking the company as background. Among the incremental cash flow brought to the company by the project, “net profit” belongs to the shareholders, “interest” belongs to the creditors, and “depreciation” refers to the recovery of investment capital. Since “net profit” and “interest” are shared by shareholders and creditors, a mean value of rate of return required by both parties should be used as the discount rate for calculating net present value; the discount rate is the weighted average cost of capital of the project. In the process of calculation of weighted average cost of capital, the cost of debt was calculated after corporate income tax, namely cost of debt= $I \times (1-t)$, but not cost of debt = i . That is to say, weighted average cost of capital was calculated after corporate income tax, no matter the rate of return is required by shareholders or creditors, it should be investigated based on after corporate income tax. Based on the calculation of net present value by taking “net profit + interest + depreciation” as the net cash flow from operating activities of the project, and weighted average cost of capital as discount rate, the cash flow would not match the discount rate, and even make wrong evaluation for the project feasibility. Therefore, the project should meet the expected return rate of investors (including shareholders and creditors), the cash flow increment created by the project each year should be “net profit + after-tax interest + depreciation.”

3.3 Selection of discount rate

Under the premise of that future cash flow can be correctly estimated, the confirmation of discount rate plays a decisive role for project evaluation. If the discount rate was too low, the investment project that should not have been adopted would be approved. In that way, on one hand, limited social resources would be wasted, on the other hand, the company would have higher risk; if the discount rate was too high, some investment project with favorable economic benefit could not be approved, on one hand, it made limited social resources unable to be used sufficiently, on the other hand, companies will lost favorable investment opportunities. Common discount rate indicators in project evaluation are mainly: risk-free rate of return, cost of funds, necessary rate of return and industrial average rate of profit etc.

Aiming at the characteristics of debt financing investment project, different discount rates can be adopted respectively according to various stages of investment, so as to fully reflect the matching between discount rate and risk and return. For example, actual interest rate of loan should be the discount rate for calculating the present value of net cash flow in the project construction period; weighted average cost of capital should be the discount rate for calculating the present value of net cash flow in the project operating period.

In the case, weighted average cost of capital = $6\% \times (1-25\%) \times 50\% + 19.5\% \times 50\% = 12\%$.

3.4 Selection of standard

If net present value method is used, three kinds of results might be available: while $NPV > 0$, it showed that there had surplus after the project used its net profit to offset the interest calculated by discount rate. From the prospective of finance normally, the project was feasible; while $NPV = 0$, it meant that the net profit of the project to be constructed just offset the interest calculated by discount rate. Now the discount rate that has been chosen for calculating net present value should be analyzed. If the discount rate is larger than the long-term loan rate of the bank, the project was considered feasible, on the contrary, the project was considered infeasible; while $NPV < 0$, it meant the net profit of the project to be constructed was insufficient to offset the interest calculated by discount rate, from the prospective of dynamic, the project would lose money, so it was infeasible.

If internal rate of return is used, internal rate of return is a discount positive indicator, while internal rate of return \geq cost of capital rate or expected rate of return, the project was feasible; otherwise, it is infeasible.

As the evaluation results of the feasibility evaluation of single project based on the main indicators of net present value method and internal rate of return are consistent, here net present value method was adopted to undertake comprehensive evaluation. The calculating process is shown in Table 1:

Table 1 Project appraisal

Unit: Ten thousand yuan

Project \ No. of period	0	1	2	3	4	5	6	7
Investment in fixed assets	-500	-1,000						
Investment in current assets			-100					
Net profit				104.25	104.25	104.25	104.25	104.25
After-tax interest				33.75	33.75	33.75	33.75	-202.5
Depreciation				276	276	276	276	276

Recovery								300
Annual net cash flow	-500	-1,000	-100	414	414	414	414	477.75
Discount factor	0.943 4	0.890 0	0.839 6	0.711 8	0.635 5	0.567 4	0.506 6	0.452 3
Net present value	-227.16							

As $NPV < 0$, the debt financing investment project is infeasible.

4 Two Unavoidable Issues of Realization

4.1 Relations between finance and accounting

Accounting, in accordance with the requirements of generally accepted accounting principles, is an information system for confirming, calculating, recording and reporting the funds movement in the process of enterprise's production and reproduction. Taking enterprise as the main body, and scarcity of capital as premise, finance studies optimal configuration and effective use of enterprise's internal resources, so as to realize the maximum of capital gain.

Although finance and accounting belong to two different disciplines theoretically, and two different functional departments practically, they have close link in the process of financial analysis and decision making, supplementing each other. On one hand, accounting provides finance with information for management. Most of information required by prediction, decision making, plan, control, evaluation and assessment are from that provided by generally accepted accounting principles. Only on the basis of full access to information, financial management can make scientific decision, and improve capital operation efficiency; on the other hand, the requirements of finance impels the development of accounting, and accounting needs to reasonably process the accounting information according to need of financial management. If financial decision aims at the predictive analysis of future benefits of the investment project, accounting is required to provide more detailed information with forward looking in a better way.

4.2 Relations between theory and practice

The mutual relation of financing and investment decision is a great concern of the theoretical circle all the time. As early as 1958, Modigliani and Miller obtained classical MM theory under the condition of perfect market. They thought that in a complete capital market investment decision mainly relies on the basic economic factors which decide enterprise' profit and cash flow status, without relation to financing methods. However, it was found after the study on many imperfect factors existing in actual economic activities, early MM theory was far from the truth of mutual relations between investment and financing decision. In fact, a kind of interaction of mutual influence and mutual effect between financing and investment decision, which includes three aspects as follows:

First of all, interest tax-saving effect of debt financing would lower the use cost of funds, improve the value of project, hence, it can promote enterprise's investment; meanwhile, on one hand, enterprise investment is possible to increase future operating income, so as to accelerate the increase of debt financing, on the other hand, it could generate a great deal of depreciation, which resulted in lacking of operating income to be pre-tax deduction of interest, hence, interest tax became valueless and lower the power of debt financing eventually.

Second, bankruptcy cost would reduce the value of liabilities to some extent, and inhibit liabilities' function of promoting enterprise's investment. In addition, after it reached a certain level, this kind of inhibiting effect would exceed the promotion role of tax benefit, which resulted in the situation of the investment declined with the liabilities; and investment decision making would have influence on the distribution of future operating cash flow, and determine future ruin probability and expected bankruptcy cost accordingly, and exert influence on enterprise's debt capacity and optimal liabilities level in this way.

Third, owing to the agency conflicts between shareholders and managers, managers under equity financing would have the phenomenon of over-investment. In order to solve this kind of investment problem, enterprise's optimal strategy would be the increase of debt financing; meanwhile, debt financing would cause the problems of shareholders' "asset substitution" or under-investment, this kind of inefficient investment would correspondingly improve the cost of debt financing, and influence enterprise's financial decision.

5 Conclusion

While debt financing has become the main source of funding for general corporate investment project, the matching of loan cash flow and project cash flow should be fully taken into consideration, and the influence of capitalized interest and expenditure interest on cash flow should be distinguished. As enterprises make financial decision by further using net present value method and internal rate of return method, they should also attach importance to the matching of loan risks and return on investment by using weighted average cost of capital as the discount rate, together with the evaluation result of the two methods to judge the feasibility of debt financing investment project. Only by combining financial decision-making with accounting information, tax benefits with bankruptcy risks, delegation with agent, and ensuring the collaboration and interaction of financing with investment decision making, can inefficient problems in investment and financing decisions be solved appropriately.

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