MSc Financial Management

Foundations of Finance 2009

Coursework

Submission Deadline: 9th December 2009, 3pm

(We recommend you not to submit in the last minute as the past student experience has shown that doing so could be extremely risky. Target submitting it 1-2 days earlier than prescribed. For submission procedures, see the module handbook on E-bridge)

Word limit: 2,500 words.

HARDING PLASTIC MOLDING COMPANY

CAPITAL BUDGETING: RANKING PROBLEMS

On January 11, 1993, the finance committee of Harding Plastic Molding Company (HPMC) met to consider 8 capital-budgeting projects. Present at the meeting were Robert L. Harding, president and founder, Susan Jorgensen, comptroller, and Chris Woelk, head of research and development. Over the past 5 years, this committee met every month to consider and make final judgment on all proposed capital outlays brought up for review during the period.

Harding Plastic Molding Company was founded in 1965 by Robert L. Harding to produce plastic parts and molding for the Detroit automakers. For the first 10 years of operations, HPMC worked solely as a subcontractor for the automakers, but since then has made strong efforts to diversify in an attempt to avoid the cyclical problems faced by the auto industry. By 1993, this diversification attempt led HPMC into the production of over 1,000 different items, including kitchen utensils, camera housings, and phonographic and recording equipment. It also led to an increase in sales of 800% during the 1975–1993 period. As this dramatic increase in sales was paralleled by a corresponding increase in production volume, HPMC was forced, in late 1991, to expand production facilities. This plant and equipment expansion involved capital expenditures of approximately $10.5 million and resulted in an increase of production capacity of about 40%. Because of this increased production capacity, HPMC made a concerted effort to attract new business and consequently recently entered into contracts with a large toy firm and a major discount department store chain. While non-auto-related business has grown significantly, it still represents only 32% of HPMC's overall business. Thus, HPMC has continued to solicit non-automotive business, and, as a result of this effort and its internal research and development, the firm has four sets of mutually exclusive projects to consider at this month's finance committee meeting.

Over the past 10 years, HPMC's capital-budgeting approach evolved into a somewhat elaborate procedure in which new proposals are categorized into three areas: profit, research and development, and safety. Projects falling into the profit or research and development areas are evaluated using present value techniques, assuming a 10 percent opportunity rate; those falling into the safety classification are evaluated in a more subjective framework. Although research and development projects have to receive favorable results from the present value criteria, there is also a total dollar limit assigned to projects of this category, typically running about $750,000 per year. This limitation was imposed by Harding primarily because of the limited availability of quality researchers in the plastics industry. Harding felt that if more funds than this were allocated, "we simply couldn't find the manpower to administer them properly." The benefits derived from safety projects, on the other hand, are not in terms of cash flows; hence, present value methods are not used at all in their evaluation. The subjective approach used to evaluate safety projects is a result of the pragmatically difficult task of quantifying the benefits from these projects in dollar terms. Thus, these projects are subjectively evaluated by a management-worker committee with a limited budget. All 8 projects to be evaluated in January are classified as profit projects.

The first set of projects listed on the meeting's agenda for examination involves the utilization of HPMC's precision equipment. Project A calls for the production of vacuum containers for thermos bottles produced for a large discount hardware chain. The containers would be manufactured in 5 different size and color combinations. This project would be carried out over a 3-year period, for which HPMC would be guaranteed a minimum return plus a percentage of the sales. Project B involves the manufacture of inexpensive photographic equipment for a national photography outlet. Although HPMC currently has excess plant capacity, each of these projects would utilize precision equipment of which the excess capacity is limited. Thus, adopting either project would tie up all precision facilities. In addition, the purchase of new equipment would be both prohibitively expensive and involve a time delay of approximately 2 years, thus making these projects mutually exclusive. (The cash flows associated with these 2 projects are given in Exhibit 1.)

The second set of projects involves the renting of computer facilities over a 1-year period to aid in customer billing and, perhaps, inventory control. Project C entails the evaluation of a customer billing system proposed by Advanced Computer Corporation. Under this system, all the bookkeeping and billing presently being done by HPMC's accounting department would be done by Advanced. In addition to saving costs involved in bookkeeping, Advanced would provide a more efficient billing system and do a credit analysis of delinquent customers, which could be used in the future for in-depth credit analysis. Project D is proposed by International Computer Corporation and includes a billing system similar to that offered by Advanced. In addition, an inventory control system that will keep track of all raw materials and parts in stock and reorder when necessary. Thereby, reducing the likelihood of material stockouts, which have become more and more frequent over the past 3 years. (The cash flows for these projects are given in Exhibit 2.)

EXHIBIT 1

Harding Plastic Molding Company

Cash Flows:

Year	Project A	Project B
0	$-75,000	$-75,000
1	10,000	43,000
2	30,000	43,000
3	100,000	43,000

EXHIBIT 2

Harding Plastic Molding Company

Cash Flows:

Year	Project C	Project D
0	$-8,000	$-20,000
1	11,000	25,000

The third decision that faces the financial directors of HPMC involves a newly developed and patented process for molding hard plastics. HPMC can either manufacture and market the equipment necessary to mold such plastics or it can sell the patent rights to Polyplastics Incorporated, the world's largest producer of plastics products. (The cash flows for projects E and F are shown in Exhibit 3.) At present, the process has not been fully tested, and if HPMC is going to market it itself, it will be necessary to complete this testing and begin production of plant facilities immediately. On the other hand, the selling of these patent rights to Polyplastics would involve only minor testing and refinements, which could be completed within the year. Thus, a decision as to the proper course of action is necessary immediately.

The final set of projects up for consideration revolves around the replacement of some of the machinery. HPMC can go in one of two directions. Project G suggests the purchase and installation of moderately priced, extremely efficient equipment with an expected life of 5 years; project H advocates the purchase of a similarly priced, although less efficient, machine with a life expectancy of 10 years. (The cash flows for these alternatives are shown in Exhibit 4.)

As the meeting opened, debate immediately centered on the most appropriate method for evaluating all the projects. Harding suggested that, as the projects to be considered were mutually exclusive, perhaps their usual capital-budgeting criteria of net present value was inappropriate. He felt that, in examining these projects, perhaps they should be more concerned with relative profitability or some measure of yield. Both Jorgensen and Woelk agreed with Harding's point of view, with Jorgensen advocating a profitability index approach and Woelk preferring the use of the internal rate of return. Jorgensen argued that the use of the profitability index would provide a benefit-cost ratio, directly implying relative profitability. Thus, they merely need to rank these projects and select those with the highest profitability index. Woelk agreed with Jorgensen's point of view but suggested that the calculation of an internal rate of return would also give a measure of profitability and perhaps be somewhat easier to interpret. To settle the issue, Harding suggested they calculate all three measures, as they would undoubtedly yield the same ranking.

EXHIBIT 3

Harding Plastic Molding Company

Cash Flows:

Year	Project E	Project F
0	$-30,000	$-271,500
1	210,000	100,000
2		100,000
3		100,000
4		100,000
5		100,000
6		100,000
7		100,000
8		100,000
9		100,000
10		100,000

EXHIBIT 4

Harding Plastic Molding Company

Cash Flows:

Year	Project G	Project H
0	$-500,000	$-500,000
1	225,000	150,000
2	225,000	150,000
3	225,000	150,000
4	225,000	150,000
5	225,000	150,000
6		150,000
7		150,000
8		150,000
9		150,000
10		150,000

From here, the discussion turned to an appropriate approach to the problem of differing lives among mutually exclusive projects E and F, and G and H. Woelk argued that there really was not a problem here at all that as all the cash flows from these projects can be determined, any of the discounted cash flow methods of capital budgeting will work well. Jorgensen argued that, although this was true, some compensation should be made for the fact that the projects being considered did not have equal lives.

QUESTIONS

1. Was Harding correct in stating that the NPV, PI, and IRR necessarily will yield the same ranking order? Under what situations might the NPV, PI, and IRR methods provide different rankings? Why is it possible?

2. What are the NPV, PI, and IRR for projects A and B? What has caused the ranking conflicts? Should project A or B be chosen? Might your answer change if project B is a typical project in the plastic molding industry? For example, if projects for

HPMC generally yield approximately 12%, is it logical to assume that the IRR for project B of approximately 33% is a correct calculation for ranking purposes?

3. What are the NPV, PI, and IRR for projects C and D? Should project C or D be chosen? Does your answer change if these projects are considered under a capital constraint? What return on the marginal $12,000 not employed in project C is necessary to make one indifferent to choosing one project over the other under a capital-rationing situation?

4. What are the NPV, PI, and IRR for projects E and F? Are these projects comparable even though they have unequal lives? Why? Which project should be chosen? Assume that these projects are not considered under a capital constraint.

5. What are the NPV, PI, and IRR for projects G and H? Are these projects comparable even though they have unequal lives? Why? Which project should be chosen? Assume that these projects are not considered under a capital constraint.

6. Doing a literature search and reviewing relevant Academic articles, evaluate ***critically*** the investment appraisal techniques used above, regarding their definition, assumptions, implications and limitations, and the riskiness of the projects.

Marking Scheme:

Questions: 1 to 5 ……. 60 marks (12 marks each)

Question: 6 ……. 40 marks