

# Appraisal techniques available to finance managers

Profession, Manager



**INTRODUCTION:**

‘ What are the different appraisal techniques available to finance managers to make decisions relating to investment projects? Discuss each of them and recommend, giving your reasons, which of them you consider as the best technique applicable to your company’.

**INVESTMENT APPRAISAL:**

Investment appraisal also known as capital budgeting. As finance manager one of the important areas of decision-making for the long-term is must to tackle the investment – the need to committed funds by buying buildings, machinery and land. Finance manager have to check of the size of the inflows and outflows of funds, for handling these types of decisions, the degree of risk and the lifespan of the investment cost of obtaining funds are despatched.

The capital budgeting cycle can be summarised in some stage which are as follows:

1. Expecting investment needs
2. Identifying project to satisfy needs
3. Examine the alternatives
4. Choose the best alternatives
5. Making the spend
6. Monitor the project

Looking at investment appraisal involves us in stage 3 and 4 of this cycle.

We can classify capital expenditure projects into four broad categories:

- Maintenance – replacing old or obsolete assets for example.
- Profitability – quality, productivity or location improvement for example.
- Expansion – new products, markets and so on.
- Indirect – social and welfare facilities.

Even the projects that are unlikely to generate profits should be subjected to investment appraisal. This should help to identify the best way of achieving the project's aims. So investment appraisal may help to find the cheapest way to provide a new staff restaurant, even though such a project may be unlikely to earn profits for the company.

### **WHAT ARE THE INVESTMENT APPRAISAL TECHNIQUES?**

Investment Appraisal also known as Capital Budgeting is used to assess whether capital

Expenditure on a particular project will be beneficial for the entity or not.

These techniques can be used to evaluate projects both in the private and public sector companies. Most commonly used the following techniques.

#### A: Traditional Methods

1: Payback Period

2: Accounting Rate of Return (ARR)

#### B: Discounted Cash Flow Methods

3: Discounted Payback Period

4: Net Present Value (NPV)

5: Internal Rate of Return (IRR)

6: Modified Internal Rate of Return (MIRR)

7: Adjusted Present Value (APV)

### **Traditional Methods**

Payback and Accounting rate of return (ARR) period are non discounted methods while all other mentioned methods are discounted. By discounted it is meant that the time value of money is considered in these methods.

#### **1: Payback Period**

Payback period calculates the time taken by a project to recoup the initial investment. For a finance manager, evaluating projects by this technique would prefer projects with short payback period than those with longer payback periods. It is simple to calculate and easy to understand.

‘ Payback’ is literally the amount of time required for the cash inflows from a capital investment project to equal the cash outflows. The usual way that firms deal with deciding between two or more competing projects is to accept the project that has the shortest payback period. Payback is mostly used as a starting screening method.

Payback period = Initial payment / Annual cash inflow

So, if £12, 000000 is invested with the aim of earning £12, 00000 per year or net cash earnings, the payback period is calculated thus:

$$P = \text{£}12,000,000 / \text{£}12,000,000 = 10 \text{ years}$$

This all looks fairly easy! But what if the project has more uneven cash inflows? Then we need to work out the payback period on the cumulative cash flow over the duration of the project as a whole.

### **Payback with uneven cash flows:**

Of course, in the real world, investment projects by business organisations don't yield even cash flows. Have a look at the following project's cash flows with an initial investment in year 0 of £120,000

### **The payback period is precisely 6 years.**

The shorter the payback period, the better the investment, under the payback method. We can appreciate the problems of this method when we consider appraising several projects alongside each other.

We can see that the payback period for two of the projects (3, 5) is six years. In this case, then, the two projects are of equal merit. But, here we must face the real problem posed by payback: the time value of income flows.

Put simply, this issue relates to the sacrifice made as a result of having to wait to receive the funds. In economic terms, this is known as the opportunity cost. More on this point follows later.

So, because there is a time value constraint here, the two projects cannot be viewed as equivalent. Project 3 is better than 5 because the revenues flow quicker in years five and six. Project 4 is better than Projects 1 and 2,

because of the earlier flows and because the post-payback revenues are concentrated in the earlier part of that period.

So it's clear that the payback method is a bit of a blunt instrument. So why use it?

**Advantages of payback:**

1st, it is popular because of its simplicity. Research over the years has shown that UK firms favour it and perhaps this is understandable given how easy it is to calculate.

2nd, in a business environment of rapid technological change, new plant and machinery may need to be replaced sooner than in the past, so a quick payback on investment is essential.

3rd, the investment climate in UK in particular demands that the investors get fast returns. Mostly long-term profitable possibilities investments are viewed due to longer wait for revenues flow.

**Disadvantages of payback:**

It has not enough real facts, which choose the length of best payback time? No one from other does – it is planned by pitting one investment opportunity against another. Cash flows are regarded as either pre-payback or post-payback, but the latter tend to be ignored. Payback takes no account of the effect on business profitability. Its sole concern is cash flow.

**Payback summary.**

It is probably best to regard payback as one of the first methods you use to assess competing projects. It could be used as an initial screening tool, but it is inappropriate as a basis for sophisticated investment decisions.

**2: Accounting Rate of Return (ARR):**

This technique compares the profit earned by the project to the initial investment required for the project. Thus a project with higher rate of return is preferred.

The Accounting rate of return expresses the profits arising from a project as a percentage of the initial capital cost. However the definition of profits and capital cost are different depending on which textbook you use. For instance, the profits may be taken to include depreciation, or they may not. One of the most common approaches is as follows:

$$\text{ARR} = (\text{Average annual revenue} / \text{Initial capital costs}) \times 100$$

Let's use this simple example to illustrate the ARR:

A project to replace an item of machinery is being appraised. The machine will cost £550, 000 and is expected to generate total revenues of £80, 000 over the project's seven year life. What is the ARR for this project?

$$\text{ARR} = [(\text{£ } 90, 000 / 7) / 550, 000] \times 100$$

$$\text{ARR} = 2. 37\%$$

**Advantages of ARR**

As with the Payback method, the chief advantage with ARR is its simplicity. This makes it relatively easy to understand. There is also a link with some accounting measures that are commonly used. The Accounting rate of return is similar to the Return on Capital Employed in its construction; this may make the ARR easier for business planners to understand. The ARR is expressed in percentage terms and this, again, may make it easier to use. There are several criticisms of ARR which raise questions about its practical application:

**Disadvantages of ARR:**

1st, the ARR doesn't take account of the project duration or the timing of cash flows over the course of the project.

2nd, the concept of profit can be very subjective, varying with specific accounting practice and the capitalisation of project costs. As a result, the ARR calculation for identical projects would be likely to result in different outcomes from business to business.

3rd, there is no definitive signal given by the ARR to help manager to decide whether or not to invest. This lack of a guide for decision making means that investment decisions remain subjective.

Discounted Cash Flow Methods

3: Discounted Payback Period



This technique works similar to payback period, the difference here is that discounted values of cash flows are used for calculation of the payback period.

#### 4: Net Present Value (NPV)

The NPV method calculates the present values for all future cash flows. The discount rate may be the Weighted Average Cost of Capital (WACC) or it may be any cost of capital depending on the risk of the project in consideration. This type of appraisal is regarded superior to the ARR and the payback period, however there are certain assumptions, on which this technique is based, making its evaluation less reliable.

The Net Present Value (NPV) is the first Discounted Cash Flow (DCF) technique covered here. It succeeds on the idea of situation cost to put a value on cash inflows increasing from capital investment.

Keep in mind that opportunity cost is the calculation of what has been given or forward as a result of a special decision. It is also referred to as the 'real' cost of taking some action. We can look at the concept of present value as being the cash equivalent now of a sum receivable at a later date. So how does the opportunity cost affect revenues that we can expect to receive later? Well, imagine what a business could do now with the cash sums it must wait some time to receive.

Looked at another way, it is simply that the business have to receive the capital to invest in the project. So, it has to wait for the revenues arising from the investment, the interest is paid on received capital.

NPV is a technique where cash inflows expected in future years are discounted back to their present value. This is calculated by using a discount rate equivalent to the interest that would have been received on the sums, had the inflows been saved, or the interest that has to be paid by the firm on funds borrowed.

### **Present Value Table**

Net Present Value tables provide a value for a range of years and discount rates. Notice the time scale used in the table:

The present value for 0 years is always 1, and this is not included in the present value table.

If we are looking to find the present value of £ 10, 0000 which you expect to receive in 5 years time, at a rate of interest of 7 %, we should use the following table:

Step 1 Look down the top column of the table (' After n years') and find 5 years.

Step 2 Look across the row titled ' At rate r' for the rate of interest of 7 %.

Step 3 Where the row for 5 years intersects with the column for 7 % in the table, there is the relevant present value factor. In this case this is 0. 713.

Step 4 Multiply £ 10, 0000 by 0. 713 = £ 71300

NPV Illustration

**Calculate the present value of the following project's cash flows, using a 10 % discount rate.**

Assessing the value of NPV calculations is simple. A positive NPV means that the project is worthwhile because the cost of tying up the firm's capital is compensated for by the cash inflows that result. When more than one project is being appraised, the firm should choose the one that produces the highest NPV.

### **5: Internal Rate of Return (IRR):**

IRR calculates the rate at which the NPV of a project equals zero. According to this method if the cost of capital of a company is more than the IRR, the project will be rejected and if it is lower than the cost of capital it is likely to be accepted. IRR and NPV concepts are correlated.

We know that when a positive NPV is produced by our DCF calculations, a project is worthwhile. We have also seen that when there are competing projects, we should select the one that produces the highest NPV. But sometimes a finance manager will want to know how well a project will perform under a range of interest rate scenarios. The aim with IRR is to answer the question: 'What level of interest will this project be able to withstand?' Once we know this, the risk of changing interest rate conditions can effectively be minimised.

The IRR is the annual percentage return achieved by a project, at which the sum of the discounted cash inflows over the life of the project is same to the sum of the capital invested. Another way of looking at this is that the IRR is the rate of interest that reduces the NPV to zero.

### **Making the investment decision**

Let's set out the criteria for accepting or rejecting investment opportunities, using the NPV and IRR.

As a Finance manager, considering whether to accept or reject an investment project, on the basis of their acquiring the funds necessary at a known rate of interest.

1: The NPV approach asks if the present value of cash inflows less the initial investment is positive, at the current borrowing rate.

2: The IRR approach asks if the IRR on the project is greater than the borrowing rate.

### Illustration of NPV & IRR

An initial investment of £ 2500 in a project produces cash inflows of £ 750, £ 750,

£ 900, £ 900 and £ 595 at 12 month intervals. The cost of capital to finance the project is 12 %. We are required to decide whether the project is worthwhile using:

#### 1. The Net Present Value

## 2. The Internal Rate of Return

A positive NPV makes the project worthwhile because the cost of tying up the firm's capital is compensated for by the cash inflows that result.

### 2. IRR

The above calculation for NPV used a 12 % discount rate and produced a positive value of £ 318. 07. We need to find a discount rate that produces a negative NPV. Let's try 20 %.

The IRR lies between 12 % and 20 %. But we can get much closer to the precise answer by using arithmetic.

IRR = 12% + Difference between the two discount x Positive NPV

Range of +ve to €" ve NPVs

IRR = 12 % + (8 % x 318. 07)

IRR = 478. 73

IRR = 12 % + 5. 32

IRR = 17. 32 %

IRR Problems

**While there are some different difficulties with the IRR, MIRR solves two of them.**

First problem is the IRR accepts that interim complete money movements are invested again at the rate of return which was same as the project which creates them. This is most often happening a plan which is not real and a

very simple situation, that the funds will be invested again at a rate where the firm's cost of capital is closure. Therefore, the IRR often provides a reasonable, hopeful image of the projects which is under study. Normally for checking the projects in the fair way, the weighted average cost of capital can be used for investing again the interim money movements.

2nd, you can find more than one IRRs for projects with different negative and positive flows of cash, which control to confusion.

### **IRR Summary:**

The value to a business of calculating the IRR is that its decision-makers are able to see the level of interest that a project can withstand. In the case where a number of projects are competing for selection, the one that is most resilient can be chosen.

### **6: Modified Internal Rate of Return (MIRR)**

(MIRR) is a managing the methods of an investment's attractiveness. It is used in capital budgeting to give the rank to different investments. Modified Internal Rate of Return is a change of the (IRR) internal rate of return and intent to solve some problems with the internal rate of return (IRR).

Using (IRR) we assumes that reinvestment rate of the company is the (IRR). (MIRR) overcomes this assumption and evaluate projects on the assumption that the reinvestment rate is the same as the company's cost of capital. This assumption for the cost of capital makes it a more effective technique as compared to the IRR.

MIRR is calculated as follows:

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$$\text{MIRR} = \sqrt[n]{\frac{-\text{FV}(\text{positive cash flows, reinvestment rate})}{\text{PV}(\text{negative cash flows, finance rate})}} - 1$$

Where n is used for the number of same periods which is at the finish stage, where the cash flows occur, PV is used for present value, FV is used for future value.

### **7: Adjusted Present Value (APV)**

APV method is used for evaluating investment in projects where risks for a project are different from the company considering such undertakings. This type of evaluation overcomes weaknesses present in the NPV technique.

Adjusted present value (APV) is similar to NPV. Use the cost of equity as the discount rate is different. For the financing effects different adjustments are made. Normally with DCF models, adjusted present value calculation is simple but boring.

Calculating the first step of an APV is to calculating the basic NPV by using the cost of equity like discount rate. The company's cost of equity and this may be the same. To recalculate using CAPM and by estimating a beta, in some cases may be it is necessary.

First calculated the base of NPV, after that calculate the NPV of every set of cash flows which results from financing. The tax results of using debt rather than equity are most obvious. The cost of debt can be discounted or that shows unknown activities about the tax effects at a higher rate. NPV of the tax effects is added then to the basic NPV.

If there are some other activities of financing, also added or subtracted, then APV is the final result.

Given capital organization unrelated, savings from the financing should be levelled by changes in the necessary return on equity and changes in capital structure as well. Normally this makes a simple NPV with the WACC like the discount rate suitable.

### **Normal NPV calculation:**

Where, in a simple situation:

These more complicated situations are more easily handled BY using Adjusted Present Value (APV), more difficult conditions are very easy to handle. APV based on the below:

APV = NPV of project pretended, it€™s all equity financed + NPV of financing results.

APV divide the total value of the project into different parts: any debt is no used for value assuming in one part, and then using the debt in capital structure we add the extra value

### **Best Technique:**

After discussing all the financial appraisal techniques, it seems that the choice of best financial appraisal techniques depends upon the nature of Project.

### **References**

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