Evaluation of Capital Investment Projects: Some key issues from a managerial finance perspective

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Capital investment projects require careful evaluation because their outcomes will impact directly on shareholder wealth. In accordance with the aims of managerial finance, companies should identify, select and invest in the projects that will maximise the returns to its shareholders. A comprehensive evaluation of a project requires consideration of many perspectives including marketing, operational, strategic and other stakeholder concerns. The aim of this article is to provide guidance for students on some of the key elements of the capital investment evaluation process from a managerial finance perspective.

Methods that are used to evaluate capital investment projects can be subdivided into two categories.

1. Those that consider the time value of money: Net Present Value (NPV) and the Internal Rate of Return (IRR) methods.
2. Those that ignore the time value of money, including the Payback and the Accounting Rate of Return (ARR) methods.

Students are referred to the detailed readings on these methods as specified in the Learning Resources section of the most recent version of the CPA Ireland syllabus. A point worth noting is that a distinguishing feature of the latter method (ARR) is the use of accounting profits while the other three methods use cash flows in their application. In the interest of brevity, the remainder of this article will focus on issues relating to NPV calculations which are an integral part of the IRR method.

Time Value of Money

The time value of money concept is a recognition that the spending power of money generally declines over time. Simply stated, €1,000 today is worth more than the promise to receive that amount at some point in the future. In order to incorporate this concept into our investment appraisal calculations, we discount (or reduce) future streams of cash depending upon certain factors. The three main factors are:

- Inflation
- Inability to consume
- Risk

Inflation – the price of goods and services generally rises over time. The measurement of that increase in prices is referred to as inflation. The higher the rate of inflation and by extension the faster the rate of increase in price levels, the less that €1 can purchase in the future. As levels of inflation increase, a higher discount rate is required to estimate what a future sum of money will be worth in today's terms.

Inability to consume – by choosing to invest in a particular project that will generate future cash flows, we are foregoing current consumption. Investors will expect reward for that delay in consumption and this is a cost that has to be met from future cash flows. This cost will need to be considered when deciding upon the discount rate to be used. For this reason, we say that the discount rate used should reflect the cost of the opportunity foregone.

Risk – the possibility that the actual return may be different from the expected return. The greater the likelihood that the expected return will not be achieved, the higher the return that an investor will require. When determining the appropriate discount rate to be used for a stream of future cash flows, it is important to recognise the required rate of return for investors. In many ways, investigating the relationship between risk and return is one of the main areas of focus for managerial finance and is fundamental to the topic of capital investment evaluation. We explore this further in the next section.

The Discount Rate

The discount rate chosen reflects the estimate of the relationship between risk and return for a proposed capital investment project. This is normally provided for students in the exam, but it is very important for candidates to understand the important implications of this figure.

At a practical level, the discount rate used can change the result of the NPV calculations. If project is perceived to be high risk, a large discount rate will apply and future cash flows will be reduced accordingly. This means that it will be more difficult for a high-risk project to have sufficient discounted (i.e. reduced) cash flows to generate a positive return on investment. Ideally, the discount rate used should reflect the risk of the project when compared with other projects of similar risk profile. As a general principle for managerial finance, high risk projects require a high return. Using the discount rate appropriate for the perceived level of risk helps us to quantify the relationship with expected return. However, estimating the correct discount rate is not an exact science. A number of theoretical approaches have been proposed to address this issue by equating the discount rate with the cost of capital and the expected return for a company.

The principles underlying the approaches to estimating a company's cost of capital are a separate topic on your syllabus. For the purpose of this article, some of the main approaches can be summarised as follows:

Weighted Average Cost of Capital (WACC)

This approach to estimating the cost of capital takes into account all of the sources of finance available to an organisation. This is done for "consistency and comparability purposes" so that all capital investment proposals can be assessed on the same basis. Proponents of WACC claim that this approach can be described as providing "a level playing pitch" (Boyd 2013, p. 236). However, there is a trade-off here because the application of a consistent, company-wide cost of capital for a particular project means that the discount rate used may not reflect the actual cost of funding the proposed investment.

Capital Asset Pricing Model (CAPM)

The CAPM was originally an exploration of the price of a capital asset (such as a company's share) and the relationship between its risk and expected return. It provides valuable insights into elements of the expected return for a company. The main elements are:

- The risk-free rate (e.g. a Government Bond for a country with a perceived stable economy).
- Systematic risk (sensitivity to macro-economic and other market-wide risk variables such as political and social factors).
- The market risk premium (calculated as the expected return from the overall market less the risk-free rate).

The expected return figure estimated by this approach can be used as a proxy for a company's cost of capital. Students should be aware that these are important factors that need to be considered when deciding on the appropriate discount rate for use in evaluating capital investment projects.

Relevant Cash Flows

Having considered some theoretical issues, we now examine a number of practical matters that need to be addressed in deciding which items should be included in the NPV calculations.

Future Cash Flows

As capital investment evaluation is part of the budgeting and planning process, we only consider future costs. Past costs (also known as sunk costs) have already been incurred and cannot be affected by the decision whether to invest in the project or not.

Two quotes from your reading list are helpful here. As Ward (2014, p. 45) has indicated, "Sunk costs arise as a result of a decision made in the past that cannot be changed. They should not influence future decision making e.g. research and development costs, marketing costs already spent." Atrill and McLaney (2018, p. 590) note the correct treatment of *committed* costs, stating, "Costs that have already been committed but not yet paid should also be disregarded".

Opportunity Costs

Opportunity costs are the costs of investment alternatives or benefits foregone. For example, if a proposed project required use of a building that could otherwise be rented to a tenant, then this rental income that the company will *not* receive (if the project goes ahead) is an opportunity foregone. Another way to look at this is to say that the company has sacrificed the opportunity to receive a cash-inflow if it decides to go ahead with the project. Even though it may be counter-intuitive, the cash-inflow forgone is treated as a cash-outflow for the purpose of NPV calculations.

Interest Payments and Financing Cash-flows

Interest payments should not be included. The discount factor that is used already takes into account the financing costs. To include interest payments would be double counting. This also applies to loan repayments, dividends and interest tax relief.

Incremental Cash flows

Where new assets are being acquired always consider the effect of that decision upon the company's overall future cash flows especially if there is an existing asset to be considered. Example 1 below illustrates the key points.

Example 1

A new machine costing € 3 million is required to manufacture a product. There is an existing machine (which originally cost €2 million) and has a written down value of €1.6 million. If the project goes ahead, this existing asset can be sold now for €500,000 instead of waiting as planned for another three years and then selling it for scrap value of €10,000. What are the relevant cash flows in evaluating the proposal?

The key to identifying the relevant cash flows is to focus on incremental items: the impact on cash flows as a result of the investment decision which will ultimately change the shareholders' wealth.

Year 0: Cash Outflow of New Machine = €3 million; Cash Inflow from disposal and sale proceeds of existing machine value = €500,000.

Year 3: Cash Outflow arising from scrap value proceeds of existing machine foregone = €10,000.

Note that the €10,000 Year 3 Cash 'Outflow' is relevant here because it is an opportunity cost. If the project did not go ahead, the company would have inflows of €10,000 as scrap value from the sale proceeds of the existing machine.

Note that the irrelevant cash flows here are:

(a) the sunk cost on the existing machine of €2 million. This is an historical cost and will not change regardless of the investment decision; and

(b) the written down value of €1.6 million. This is a mere book entry - no calculations are required because book values are independent of the decision to invest in the new machine.

Overheads

Allocated overheads should be ignored. A project may be charged with a share of fixed overheads (e.g. cost of providing administration services) but as the costs will be incurred irrespective of whether or not the project is undertaken, the amounts for allocated fixed overheads are excluded. These expenses (usually head office costs) are non-incremental cash flows.

By their very nature, variable overheads associated with the proposed project will always be relevant in decision-making.

Working Capital

Launching a new product can require a net investment in working capital (trade receivables and inventory less trade payables). Working capital would normally be shown as a cash outflow at an early stage (usually Year Zero as an immediate cash outlay). However, at the end of the life of the project the additional working capital will normally be released. This means that the amount of the net working capital will be an inflow in the final year of the project. This arises because it is assumed that the initial amounts invested in the inventory and receivables are realised and used to pay the credit suppliers and the surplus is available for the company at the end of the project.

Depreciation

Ignore depreciation charges. They are estimates of the reduction in values of assets and are non-cash items. They are legitimate expenses in the Income Statement but should not be included in the cash flow analysis.

Existing Resources

Where the company has existing resources (usually raw materials) we must decide on the relevant costs to the project of using these resources. These are three of the possible costs:

a) Original purchase price (historic cost)
b) Current replacement cost
c) Resale value

As explained above (see Example 1) the original purchase price (or historic cost) is never relevant as it is a past cost, also known as a sunk cost.

The relevance of the other costs will depend upon the circumstances.

If resources that are held can be used elsewhere in the company, then use the replacement cost. The reasoning here is opportunity cost related. If the resources are used on the project, they will have to be replaced. Therefore, the current replacement cost is the opportunity cost of their use.

If the resources already held in inventory have no other use in the company (other than their possible use on the project) then they will not be replaced. This might arise if there is excess stock of raw materials. If this inventory has a resale value then this is the figure to use because it is the opportunity cost to the project. The company in using them on the project foregoes the opportunity of selling them and receiving a cash-inflow.

A further issue that sometimes needs to be considered is the disposal costs of materials. This can arise if the materials are hazardous and will need to be disposed of safely if they are not used on the project. If they only have a disposal cost, then their use on the project would save these costs. Therefore, this would be shown as a cash inflow because the project evaluation should account for this saving in disposal cost.

It has been noted that where the objective is to achieve long-term shareholder wealth maximisation, the process of capital investment evaluation "requires allowance for the opportunity cost of capital or time value of money as well as robust analysis of relevant cash flows" (Arnold 2013, p. 78). It is hoped that this article will provide useful managerial finance perspectives on some of the theoretical and practical issues involved in the evaluation of capital investment projects.

References:

Arnold, G. (2013) *Corporate Financial Management*, 5th Ed, Pearson

Atrill, P. and McLaney, E. (2018) *Accounting and Finance An Introduction*, 9th Ed, Pearson

Boyd, G. (2013) *Capital Investment - A Guide to Making Better Decisions*, Chartered Accountants Ireland

Ward, AM. (2014) *Finance Theory and Practice*, 3rd Ed, Chartered Accountants Ireland