

**Explain the theoretical rationale for the NPV approach to investment appraisal and compare the strengths and weaknesses of the NPV approach to two other commonly used approaches**

NPV is short for Net Present Value. It is used as an approach to investment appraisal. The NPV shows the difference between a project's present value and its cost. Naturally a positive value is best for companies and shareholders alike.

To calculate the Net Present Value, the Present Value (PV) of the project must first be calculated. This is calculated by dividing the project's future value after  $t$  time periods – by  $(1+r)^t$  where  $r$  is the interest rate. It shows how much the future worth of the project is worth in today's terms. Net Present Value is shown by subtracting the required investment for the project from the Present Value. This shows a potential market value for the project once it were under way. 'The discount rate ( $r$ ) is often known as the opportunity cost of capital – the expected rate of return given up by having invested in a project' (Brealey et al, p181). This expected rate of return is basically what could be earned by investing in a government bond or such like – which is a guaranteed return.

After calculating the Net Present Value a number is obtained which can be negative or positive. 'The net present value rule states that managers increase shareholders' wealth by accepting all projects that are worth more than they cost. Therefore, they should accept all projects with a positive net value' (Brealey et al, p181). With a positive NPV then the project will be 'worth more than it costs – so it makes a net contribution to value' (Brealey et al, p181).

The Net Present Value rule is used to maximise shareholder wealth – a main aim of firms internationally. It applies as a rule only under Irving Fishers separation theorem of a perfect capital market (PCM). In a PCM there are no transaction costs or barriers that may oppose a firm or investor's access to capital markets. This implies that interest rates on borrowing and investing are equal. Another feature of the PCM is that markets are competitive, free and equal and no one participant has enough power to influence prices. Hence in this environment the firm's investment decision depends only on estimated cash flows from the investment and market interest rates. These figures are interpreted in the NPV calculation and firms should only accept projects with a positive NPV.

The main advantage of the NPV is that it accounts for the time value of money, unlike other methods I will look at later. This is important as it can give a clearer indication of the real returns that can be available from a project. Secondly, the NPV approach concentrates on expected cash flows and returns to capital. This makes the NPV relevant for calculating the profitability of a particular project in consideration. If other factors such as manager's tastes, company's choice of accounting method or profitability of other projects were considered in the calculation, the result would not be as useful in determining whether or not a project should go ahead.

Another advantage of the NPV is that the method will recognise the value added by long-term projects unlike some other methods.

NPV is also a way of comparing projects in terms of value created and therefore firms can rank and prioritise. In theory businesses should undertake all projects that have a positive NPV i.e. deliver a return above the cost of capital. However, a great number of projects asks the question has a business got the capability (management, project skills) to manage each project effectively and realise the expected benefits.

The main disadvantage of the NPV method is that it is tricky to predict future cash flows and to know which discount rate to use. Cost of capital is the average weighted cost of capital, which is made up of debt (i.e. overdraft and fixed loans) and equity (return required by investors). Debt is cheaper, but if you invest more in debt then the return required by equity investors is greater (because the risk is higher – the debt holders have first call on returns).

Another disadvantage is that if the NPV method produces a negative value than the rule states that it should be rejected out of hand. This could lead to projects with potential being rejected when perhaps slightly different conditions such as a change in interest rates might make a big difference. There is no account of a possibility to defer a project to a later date.

The first alternative method I will look at is the 'payback rule'. 'A project's payback period is the length of time before you recover your initial investment' (Brealey et al, p185). When a firm uses the payback rule it must decide on an appropriate cut-off period – if the project recovers the initial investment within the cut-off period than it will be acceptable, if it does not make the cut-off point than it will be rejected.

The main advantage of this rule compared to the NPV is that the payback is extremely simple to calculate and evaluate. This can appeal to managers who find it easy to use.

One obvious weakness in comparison to the NPV model is that there is no account for the time value of money. There is no discounting for the required rate of return and so, a cash flow of say £100 in the third year is treated as £100, but in reality it is worth less than that.

The payback rules does not recognise the time value of money like the NPV method, so it will favour short term investments. In turn it will favour short term projects/investments which are often smaller and deliver smaller returns.

Longer term projects are often more risky because there is less certainty about the cash flows in future years, but if businesses avoid risks then they are likely to get lower returns. With the payback rule even projects which have a positive NPV value can be rejected, meaning the firm could miss out on good returns.

The accounting rate of return (ARR) method is another method used by firms.

To calculate the ARR, the firm needs to determine average net income. This is cash flow minus taxes and depreciation. Depreciation is treated as a charge as opposed to a cash outflow.

The average book value of the investment is also required. Depreciation reduces the value of the investment each year. This is why the book value figure varies over time. The calculation is the addition of the investment values divided by the number of time periods (i.e. years). Finally, the firm have to set a target ARR percentage.

With this data, the ARR is a calculation of the average project earnings after taxes and depreciation divided by the average book value of the investment during its life.

For example, if a firm's average net income is £50000 and the average investment is £250000, the ARR is simply  $50000/250000 = 20\%$ . The firm accept the project if their target ARR is below 20% and reject if their target ARR is above 20%.

The ARR method is easy to calculate since it uses data that the firm's accountants will use in other areas.

The disadvantage again is that this method does not account for the time value of money, like the NPV method does. Another problem might be that the target is chosen by one individual whilst another may think a different target may be more appropriate.

## Bibliography

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