

# Making Investment Decisions with the Net Present Value Rule

Marc Meyer, 2010-09-22

## Preface

### Considerations before an Investment

Doing an investment is not just an offhanded idea. It takes time to think about it and consider some important rules. Generally spoken the investor needs to forecast the project's cash flows. Those have to be discounted by the opportunity costs. The result of the project's net present value (NPV) must be positive. Only a positive NPV increases shareholder value.

First, you should answer some basic questions. How many pieces of my product are likely to be sold each year? At what price? How great will the investment into new facilities be? How long will the product stay in production? And, what happens to it after the end of its lifetime? These questions should be answered completely and accurate. The main problem will be to find out what the hidden cash flows are and what are those that look like cash flows, but are not in reality.

## Applying the Net Present Value Rule

You can be sure, that an investment in any asset creates wealth. Assumed the discounted value of the future cash flows exceeds the actual costs/cash flows later on.

To calculate the NPV use those formulas:

$$NPV = C_0 + \frac{C_1}{(1+r)} + \frac{C_2}{(1+r)^2} + \text{etc}$$

$$\text{Real discount rate} = \frac{1 + \text{nominal discount rate}}{1 + \text{inflation rate}} - 1$$

$C_0$  = Cash Flow at the point in time 0 (now)

$C_1$  = Cash Flow at the point in time 1 (year 1)

$C_2$  = Cash Flow at the point in time 2 (year 2), etc.

$(1+r)$  = Discount Rate

Consider three general rules when you get to the problem of what to discount.

### Only Cash Flow is Relevant

It is very important to remember that the net present value depends on future cash flow. Cash flow itself is a very simple thing: it describes the difference between cash paid and cash received. Do not confuse it with the accounting income.

Be sure that you estimate the cash flow on an after-tax basis. It is also important that the cash flows are recorded when they occur, which means discounted from the actual payment date, not from that date that is in the books.

### Estimate cash flows on an incremental basis

There are several things that should be watched at the time you are deciding which cash flows are going to be included.

Some investment turns out to be a poor choice. In those cases many managers hesitate to throw good money after bad money. Even though occasionally, the investment encounters turnaround opportunities with a positive NPV. On the other hand, it does not always make sense to throw good money after good. For example, an elderly horse that won many championships will surely not win more championships.

Launching a new model means always cutting the sales of the existing model. There are possibilities to offer modified or improved versions. Those incidental effects, called “downstream” need to be factored into the cash flows.

The working capital is in many projects a major investment that should be recognized in the cash flow forecasts. At the end of the project it often recovers some of the investment.

Opportunity costs, where no cash changes hands can be very relevant to an investment either. Judging the project with the comparison, with or without is much better than before against after. For example, the firm owns land and uses it for the project. It cannot be sold like it could without the project. It means that with or without owning the land cash flow is generated, compared with owning the land before or after the project generates no cash flow.

Some investments generate lowered costs until you can make your decision, whether you accept or reject a project. Those costs are irreversible and should be ignored.

### **Treat Inflation Consistently**

It is very important that the discount rates as well as the cash flows are consistently treated both either in nominal or real terms. *Never* mix them.

## **Equivalent Annual Costs**

Sometimes it is necessary not to express the yearly cash flows as a lump-sum value but rather to reverse the calculation to show a stream of future cash flows. This annuity is called equivalent annual cost, which is the annual cash flow sufficient to recover the capital investment, including its cost over the investment's life-time.

### **Choosing between Long and Short-Lived Equipment**

This method is helpful in choosing between two machines that have different economic life-times.

You look for the year's annuity factor and multiply it with the annuity payment. This result equals the present value of the investment:

PV of annuity = annuity payment X x-year annuity factor

Then compare the annuity payments. The better investment is the one with the lowest equivalent annual cost.

Considering the inflation as well as the technological change in addition makes the result more exact.

## **Summary**

The NPV is a tool to help you decide whether to accept or reject an investment. However, remember it can only lead you to the right decision if the predictions that are made are appropriate. Every cash flow forecast depends on the market situation and the project itself.

Needless to say, the principles of valuing capital investments are the same worldwide; but assumptions and inputs are different in each country.