

L8: Estimating the profitability of an investment

Let us look at the estimated **free cash flows** of a start-up. In brief, free cash flow refers to the money received from customers less the money paid for resources required to create and run the business. If the business proves to be successful, the margin will become positive. The firm can use the surplus to gratify those who have funded the venture. Owners receive **dividend**. Creditors receive interest and repayment of the loan. By defining free cash flow, we can separate the cash flow caused by the business operations and the cash flow related to funding these operations.

Cumulative free cash flow illustrates how the business generates net cash flow over time. First, the entrepreneurs must develop their product and build the production system. The firm uses money to pay for the various resources it needs but there are not any payments from customers. The periodic free cash flow is negative. The cumulative free cash flow curve dives until the firm starts deliveries to the paying customers. (**Time-to-market**; need of financing by the founders)

After this point, the periodic free cash flow turns positive. The firm must pay the costs of running the business but the received payments from customers offset the operating costs. Eventually, the cumulative free cash flow reaches the zero-level.

Now, we have defined two new concepts related to the venture's life cycle: **time to first sale** and **payback period**. Assuming the entrepreneurs funded the start-up only using their own money, we might say that, after the payback period, they are on their own again. However, they have not earned anything yet – at least in financial terms. A financially rational individual expects to get some return on her investment. We can demonstrate this by comparing alternative investment opportunities.

Suppose you can lend 10 thousand euros to a reliable person who promises to pay you back 10 thousand and 5 hundred euros in a year. In other words, she agrees to pay an annual interest of 5 %. The alternative is to fund the firm of your friends by becoming a shareholder. You purchase shares of Jouko Karjalainen their firm worth ten thousand today. Your friends say that they will sell their company in a year and you will receive a fair price for your shares. Would you be satisfied, if you were able to sell your shares at less than 10 thousand and 5 hundred euros?

Now, let us reverse the problem. Another equally reliable person promises to pay you 5 thousand euros in a year if you lend him money today. What is the maximum amount of money you would loan? Your reference rate of return is still 5 % but you reverse the calculation. In other words, you discount the sum that you expect to receive in a year to its present value using an appropriate discount rate.

How much would you expect to get from your shares, if your friends would sell the company after two years – instead of one year? The reference rate is 5 % but you should expect compound interest for your investment of 10 000 €, that is 11 025 €. Reversely, if you expect to receive 11 025 € in two years, you can discount the sum to its present value of 10 000 €.

The basic formula of present value gives us a means to compare cash flows that occur at different points in time. It is possible to adjust the formula and the discount rate for other time intervals than a year, but to keep things plain, we shall measure time in years, for now. The discounted cash flow technique articulates the time value of money: A euro today is more valuable than a euro in the future. Considering the cumulative cash flow of a startup, relatively short time to first sale and payback period are desirable.

A startup generates multiple free cash flows that occur at different points in time. We can easily discount this stream of cash flows by estimating annual free cash flows and discounting them to their present value using the basic formula. Note that we discount only future cash flows. The cash flows occurring now are already at their present value. When we add all the present values, we get the net present value of the annual free cash flows. We can use this concept to evaluate the future cash flow caused by a start-up's business operations. Likewise, we can apply the procedure to a discrete investment projects within a firm.

Net present value is the most important indicator of the profitability of an investment project. It indicates how much a planned investment contributes to the value of the firm. If the estimated free cash flows and the discount rate behind the net present value are reliable figures, a financially rational decision maker should undertake projects that have positive net present value. Executing such a project is equivalent to receiving its NPV in cash today.

Likewise, the net present value of all the future free cash flows of a firm equals its enterprise value. It represents the sum that investors will pay for a startup that has no outstanding loans. If the firm has debt, investors pay less because part of the enterprise value – the value of the debt to be exact – belongs to the firm's debtholders.

Net present value is a tool to support decision-making. In this context, we anticipate the forthcoming consequences of the decision: what will be the additional benefits and costs if we decide to realize our plan. In a case of a startup, all the free cash flows of the firm result from the decision to found a company. You start from the scratch, make a green-field investment. On the other hand, discrete investment projects are more or less blended with the existing business of a company. In such cases, it becomes more difficult to separate cash flows caused by the project from cash flows that would happen anyway.

People often tend to take into consideration past costs related to the investment project. This is a mistake because the past costs are **sunk costs**. They have already occurred and the decision on hand will not bring the money back.