

The Net Present Value

- The need to compare investment opportunities is widespread in economic and business settings.
- The use of the appropriate tools and concepts is key to reach appropriate investment decisions.
- The Net Present Value (NPV) is a simple yet powerful tool in business and economic investment decision making.
- The idea is simple, just compare the present value of the stream of future cash-flows, discounted at a given interest rate, which is understood to represent the cost of funds.
- For this to be a useful tool you first need to have accurate measures of investment costs and reliable projections of your future cash flow, and the discount rate to use. For the moment we are going to assume you know these measures with certainty, perfect foresight.

- Let us start with an example:

We have a Commercial Real Estate property that was destroyed by an Earthquake. The insurance company pays \$ 200,000, and the lot is worth \$ 50,000.

The investment choices are:

- Cash Out (A): Get the \$ 250,000 now and nothing next year.
- Build New Office Building (B): Invest \$ 100,000 now, sell the new building next year by \$ 400,000.
- Invest in Stock Market (C): Get nothing now and receive \$280,000.

The interest rate is 12%.

The NPV of the choices are:

- A (Albert): \$ 250,000
- B (Basco): $\$257,143 = -\$100k + \$400k/1.12$
- C (Carl): $\$250,000 = \$280k/1.12$

Choose B: Why?

1. When B is compared to C, it is easy to see that you can borrow \$100,000, pay the bank \$112,000 next year, but still make \$288,000 next year compared to \$ 280,000 in case C.
2. When B is compared to A, borrow \$350,000, pay A, then invest and essentially have (\$ 250,000; and \$ 8,000). Pay \$ 392,000, in period 1, and get the other \$ 8,000.

- There are many underlying assumptions, one of the most important is that the capital markets are perfect, and the agent faces the same interest rate when borrowing and when investing money.
- Using the concept of the NPV, we can define the IRR, Internal Rate of Return, as the interest rate results in a NPV equal to zero, so that any cost of funds lower than that interest rate delivers a positive NPV.
- Some alternatives to the NPV and the IRR are quite common, like Payback period, but they put the same weight in all cash-flows.