Real & Nominal Questions

1

Question

What is the difference between deflating a net cash flow and discounting a net cash flow?

2

Answer

Deflating is getting purchasing power (how much we can buy with the net cash flow)

Discounting is getting NPV. In other words, comparing the project with an alternative investment.

3

Question

What is a nominal NPV?

In what units are nominal NPVs measured?

4

Answer

A nominal NPV is the discounted value of the nominal (actual) net cash flow. We use a nominal discount rate (actual interest rate).

It is measured in dollars.

5

Question

What is a real NPV?

In what units are real NPVs measured?

6

Answer

A real NPV is the discounted value of -

the real (= purchasing power) of the nominal net cash flow.

We use a real discount rate (= purchasing power of the interest rate).

It is measured in purchasing power (G&S).

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Real & Nominal Discount Rate Questions

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Question

If the nominal discount rate is 12% and inflation is 4%, what is the real discount rate?

9

Answer

The real discount rate is approximately -

12% minus 4% = 8%

More accurately (and better), it is -

(1+12%)/(1+4%) minus 1 = 7.7%

This is the real return (= purchasing power of the return) on its alternative investment.

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Question background

A US company called "USCo" is considering investing in a project in "Country". Country will not allow the company to expatriate any cash flow generated by the project. The money has to be spent in Country. The rate of inflation in Country is forecast to be 7% per year. Alternatively, USCo could invest in the USA where the return it could earn on its money would be 14% per year in nominal terms. The forecast rate of inflation in the USA is 5% per year.

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Question

If you wanted to estimate real net cash flow, what deflation rate would you use to deflate the net cash flows of the project in Country and why?

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Answer

I would use a deflation rate of 7% per year because that is the rate of inflation in Country where USCo must spend its net cash flow.

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Question

What is USCo's nominal discount rate and why?

14

Answer

USCo's nominal discount rate is 14% per year because that is the nominal (= actual) return on its alternative investment in the USA.

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Question

What is USCo's real discount rate and why?

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Answer

USCo's real discount rate is -

(1+14%)/(1+5%) - 1 = 8.6% per year

because that is the real return (= purchasing power of the return) on its alternative investment in the USA (where it spends its return from the bank).

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Question

Suppose Country relaxed its rules and allowed USCo's cash flow to be expatriated. Assuming that USCo wanted to expatriate its net cash flows to the USA, what would be USCo's deflation rate for its net cash flows?

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Answer

USCo's would use a deflation rate of 5%, which is the inflation rate in the USA where it spends its net cash flow.

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Question

Suppose Country relaxed its rules and allowed USCo's net cash flow to be expatriated to the USA. Assuming that USCo wanted to expatriate its money to the USA, what would USCo's (a) nominal and (b) real discount rates be?

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Answer

USCo's nominal discount rate would remain 14% per year because that is the nominal (= actual) return on its alternative investment in the USA.

21

Answer

USCo's real discount rate would remain -

(1+14%)/(1+5%) - 1 = 8.6% per year

because that is the real return (= purchasing power of the return) on its alternative investment in the USA.

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Answer

These last two answers highlight the fact that the nominal discount rate is separate from the project and the real discount rate depends on where you spend the money you take out of the bank.

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Nominal & Real NPV Questions

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Question

When is a nominal equal to a real NPV?

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Nominal = real NPVs

Nominal and real NPVs are the same numerically when -

The deflator for the net cash flow

=

The deflator for discount rate.

This true almost always.

However, a nominal NPV is in dollars and a real NPV is in purchasing power (G&S).

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Internal Rate of Return (IRR) Questions

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Question

What do the individual words in the title "Internal Rate of Return" tell you about what the Internal Rate of Return (IRR) represents?

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Answer

"Internal" - Not external. We do not need anything outside the project to calculate the IRR.

"Return" - What we receive back from the project.

"Rate" - How fast we receive the return.

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Question

Imagine a simple net cash flow (invest and then receive a positive return).

Why does the NPV against discount rate curve goes down as we increase the discount rate?

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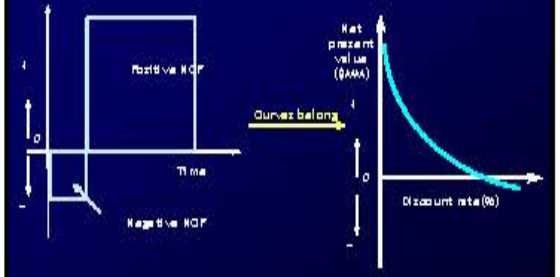
NCF and NPV curves for a simple investment



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Answer

The NPV goes down because -

(a) The negative net cash flow is at the start of the project and the positive NCF comes later.

and

(b) Increasing the discount rate hurts the late positive net cash flows more than the early negative net cash flows.

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Question

What is the definition of an Internal Rate of Return?

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Answer

An Internal Rate of Return is any discount rate that makes the net present value equal zero.

It is a discount rate that makes the discounted positive net cash flows equal to the discounted negative net cash flows.

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Question

How do we calculate an Internal Rate of Return?

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Answer

There is no algebraic formula for calculating the Internal Rate of Return.

We calculate an Internal Rate of Return by trial and error. We calculate the NPV using different discount rates and find a discount rate that makes to NPV close enough to zero.

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Question

How do we use an Internal Rate of Return?

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Answer

We compare an Internal Rate of Return (IRR) with our discount rate.

If an IRR is greater than our discount rate, then we assume that the project is economically viable.

If an IRR is less than our discount rate, then we assume that the project is not economically viable.

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Question

A project's nominal Internal Rate of Return is 25% per year. The decision maker expects the future rate of inflation to be 3% per year.

Write an expression showing how to calculate the project's real Internal Rate of Return.

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Answer

The company's real Internal Rate of Return would be -

(1+25%)/(1+3%) - 1 = 21.4% per year

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Question

Write the format of the Excel function to calculate the Internal Rate of Return.

Time	0	End1	End2	End3	End4
NCF$	-100	150	100	70	50
Cells	A3	B3	C3	D3	E3

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Answer

The format of the Excel function for the Internal Rate of Return is below.

=IRR(A3:E3,First Guess for the IRR)

Or

=IRR(A3:E3)

(Excel has a default for the first guess)

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Question

For the example net cash flow below, why do we put in ALL of the cash flows into the IRR function in Excel including the NCF at time = 0?

Time	0	End1	End2	End3	End4
NCF$	-100	150	100	70	50
Cells	A3	B3	C3	D3	E3

Answer

We put in all the net cash flows because the IRR does not depend on when the net cash flows begin.

The IRR balances the discounted positive and the discounted negative NCFs. Using the IRR, these balance whenever the NCF starts.

Several IRR Questions

Question

A project has an IRR of 5% and an IRR of 62%. Which IRR should we choose to make an investment decision? Why?

Answer

It is too difficult (impossible) to make an informed decision using the two IRRs.

We should ignore the IRRs and instead make a decision based on the project's NPV at a reasonable range of discount rates.

Question

If someone tells you that a new project has an internal rate of return of 28%, what would be your reaction?

Answer

I would ask what the other IRR is, or what the other IRRs are and, particularly, what are the NPVs at a reasonable range of discount rates.

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Question

Why is the Internal Rate of Return a dangerous indicator to use for investment decision making. What would be a more reliable indicator to use? Why?

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Problems with IRR

1. IRR measures speed (not $)
2. IRR is a % (not $)
3. There are usually several IRRs
4. IRR does not measure delay

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Advantages of NPV

1. The NPV measures value
2. The NPV is a single number for a given discount rate
3. The NPV reflects delay

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