

CAPITAL BUDGETING

PAYBACK PERIOD – “How many years will it take to make our money back?”



Simple Math

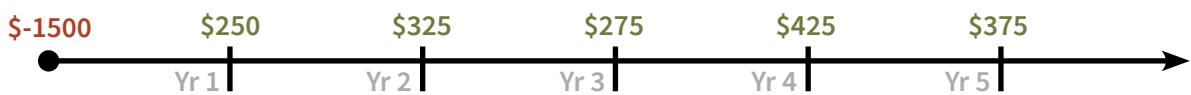
The firm spends \$1500 on a machine that will make them a few hundred bucks a year. By adding the profit to the negative balance, we can see how long it takes them to “break even” (hit zero) on the books. Where *exactly* does it break even? For that, we take the final year’s balance and divide it by how much cash the machine will make in that

final year: $\$225/\$375 = .6$ of a year. So, the payback period for the \$1500 machine above is 4.6 years.

Management for Dummies

The decision to do the project is based on how long management decides it should take to pay back. Let’s say they set 5 years. Since Payback Period says that the project will pay for itself in 4.6 years, it will get approved.

NPV (NET PRESENT VALUE) – “How much money will this project *actually* make us?”



What Are Those Future Cash Flows Worth Today?

Payback Period doesn’t work because of the time value of money. Let’s say the firm’s required rate of return (or discount rate) is 12%. Even though Payback period says that the project will MAKE \$150 in five years, the time value of money says that the firm would actually LOSE over \$300!

Decisions, Decisions

Deciding whether to do the project is easy: Will it make us any money? If yes, then do it! If $NPV > 0$, then go for it.

How to Do it on the BA II Plus

1) ALWAYS clear your calculator before a cash flow problem:



2) $CF_0 = -1500$ (use the $+\text{-}$ key AFTER typing in the 1500). Then hit [ENTER] and down arrow.



3) Enter each of the year values ($C01 = 250$, $C02=325$, etc.) by typing in the number, then [ENTER] and the down arrow TWICE. (Twice because you’re skipping the F’s.)



4) Hit the NPV key, and it’ll ask you for I. Enter the percentage rate (just 12, no percent sign), then then hit [ENTER] and the down arrow.



5) Your calculator will prompt you to compute the NPV. To do that, hit the [CPT] key.

6) Your answer should be $-\$339.08$. Since the firm is losing money, the decision on this project should be to reject it.

IRR (INTERNAL RATE OF RETURN) – “Will the project’s rate of return be high enough for us?”

What Percentage Will We Make on This?

Net Present Value is a value, which is in dollars. Internal Rate of Return is a rate, which is a percent!

Decisions, Decisions

How high of a percentage rate of return do we need? Whatever the rate of return (or discount rate) is. Think about it: If the firm needs a 9% return, but the IRR’s only 8%, they’re

going to pass. So, if $IRR > \text{discount rate}$, then it’s a yes.

How to Do it on the BA II Plus

Just do #’s 1-3 above and then:



4) Hit the IRR button and then [CPT]. The IRR of this project is 3.04%, which is MUCH less than the 12% they need. So this one is going to be a big fat NO.

PI (PROFITABILITY INDEX) – “What is the project’s payoff-to-investment ratio?”

What Percentage Will We Make on This?

NPV is a value, IRR is a rate, so let’s get a ratio, too! Profitability Index measures the present value of all the future cash flows and compares it to the initial investment.
 $PI = PV \text{ of future cash flows} / \text{Initial investment}$

Decisions, Decisions

What should the ratio be? Well, if you’re comparing payoff

to investment, then the answer better be higher than one, right? If $PI > 1$, then let’s do that project.

How to Do it on the BA II Plus

If you haven’t figured this part out yet, you’re solving for future cash flows and dividing by the cost of the project. You’re just doing NPV with a CF_0 of zero, and then dividing the answer by the project cost.