Choice Summary

Goals

- Be able to make a *financial* argument for the choice of one asset over another.
- Be able to use all the criteria depending on client needs.
- Do some calculator practice.
- The third tent pole "Choice" http://ec314-pdx-edu.wikidot.com/q3:choice

What We Did

- Massive Time Value of Money Calculations using the factor notation learned before.
- Identification of the Minimum Acceptable Rate of Return (MARR) as the interest rate that we use for Time Value of Money calculations.
  - Slight confusion when dealing with loans but those interest rates are used to produce cash flows, not evaluate them.
  - MARR is not used to calculate loan payments.

What We Did (Con't)

Identification of two environments

- Unconstrained
  - As many as you with but not more than one of any choice.
  - "Acceptable"
  - "Which assets?"
- Exclusive
  - At most one
  - "Best"
  - "Which asset?"

The Three Consistent Tests

- Present Worth
  - Life-cycle cost and benefits ($)
  - Unconstrained: If $PW \geq 0$ get it.
  - Exclusive: Choose largest PW
- Annual Worth
  - Per-period costs and benefits ($)
  - Unconstrained: If $AW \geq 0$ get it.
  - Exclusive: If assets have the same life, choose asset with largest AW
- Internal Rate of Return
  - Per-period costs *or* benefits (%)
  - Unconstrained: If a single IRR exists ...
    - If investment, get it if $IRR \geq MARR$.
    - If loan, get it if $IRR \leq MARR$.
  - Exclusive: IRR Procedure (Later in Class)

Key Intuition on Unconstrained Choice

You are trying to make the case that the specific asset that you are looking at does better than the opportunity cost of funds – MARR.

That opportunity cost could be:

- A loan: If you don't fund the asset, you have a smaller loan.
- Money in an account: If you don't fund the asset, money in the account still earns interest.
- The usual return on assets: If you don't fund the asset, you can still do what you usually do and get that rate of return.

Comments on the Tests

Present Worth

- Your preferred method.
- Do this when things get hard.
- Great for questions about delay
  - Should you put it off even if it makes it more expensive.
- Clients hate it because it is unintuitive.
- Later – will be best for capital budgeting, limited year zero cash flow, problems.

Comments on the Tests

Annual Worth

- Clients preferred method
- Requires you to make a present worth calculation and then convert.
- Great for questions about repeated purchases
- Clients tend to like this because it fits their conception of problems.
- Many names for this number. You have to ask what they mean just to be sure.
- Be careful of:
  - The IF, same life, when interpreting in the non-repeat purchase case.
  - Describing the per period costs when asset lives are not factors of the planning horizon.

Comments on the Tests

Internal Rate of Return

- Clients with financial background prefer this, but rarely do they understand that there can be multiple answers.
- Computationally most complex
  - In real life – Root finding.
  - In exams, it is easy, $\left(-\frac{A_N}{A_0}\right)^{\frac{1}{N}} - 1$, but only works with two values.
- Sometimes you need to omit answers so client is not confused
- Be careful of:
  - The IF, loan vs investment, the criteria flips. High IRR is good for investments and low IRR is good for loans
  - That procedure should not be used in the real world.

How to Drill and Kill

- One of the tent poles http://ec314-pdx-edu.wikidot.com/q3:choice
- Worked examples https://drive.google.com/drive/u/0/folders/0B3iIawp4z7oISUVpa2VPQWtYem8
- Pay attention to the IRR procedure because that is what people mess up most.
- PW and AW are easy as long as you can spot the key indicator phrase, “service life”.
- Environment is easy to spot with:
  - Asset or best = Exclusive
  - Assets or acceptable = Unconstrained