



Presentation to ENSC201 Class

Financial vs Economical
& Time Value of Money
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Mike Volker (mike@volker.org)
University/Industry Liaison Office
Simon Fraser University

Economical

- ◆ Cost vs Benefit
- ◆ What is the lowest “cost”

examples:

Capital Equipment
(machinery, vehicles, buildings, etc)
Buy, Lease, Finance?

Financial

- ◆ How much money do we need?
- ◆ How to finance? (what are the alternatives)

e.g.

It may be more economical to purchase a car than to lease it, but it may be financially better to lease it (cash flow constraints)

Example – GM Car Advertisement

(from recent Vancouver Sun advert)

Buy for:	Or Lease:	Or Finance:
\$21,688	\$228/mo (48m)	0% (60m)

Which is better?

Financial: lease (usually)
Economical: finance

If you have the cash, should you buy it?

Depends on i (external), your i (internal), cash constraints
(and also tax considerations: GST/PST when added?)

What's your decision?

- ◆ The decision as to whether to buy the car outright for \$21.7K or finance it over 60 months (i.e. 60 monthly payments at zero interest) is a no-brainer.
- ◆ In the advert you can also lease the car for 48 months for \$228/month (assume that you can buy the car for 30% of its present value at the end of the lease). Is it better to lease or finance it? Well.....that depends!
(what i is implied in the lease program?)

Basic Time Value Formula:

\$100 invested today at 10% becomes:

$$\$100 + 10\% \text{ of } \$100 = \$110$$

$$\$110 + 10\% \text{ of } \$110 = \$121$$

$$\$121 + 10\% \text{ of } \$121 = \$133$$

etc

$$\text{i.e. } F = P(1+i)^n$$

The Basic Time Value Equation

$$F = P(1+i)^n$$

F = Future Value

P = Principal Amount

i = interest rate per period

n = number of periods

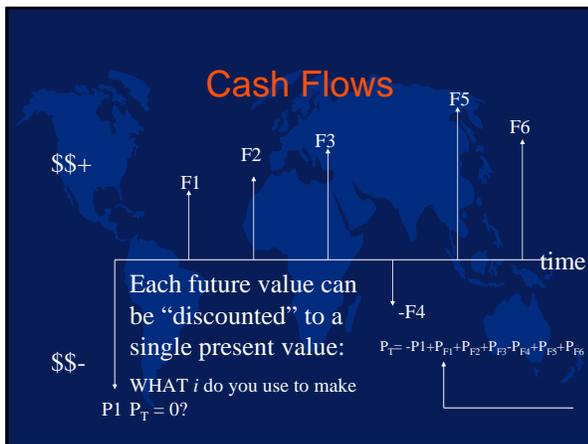
From this you can derive the following formulas:

Time Value Formulas

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Factor Name	Converts	Symbol	Formula
Single Payment Compound Amount	to F given P	$(F/P, i\%, n)$	$(1+i)^n$
Single Payment Present Worth	to P given F	$(P/F, i\%, n)$	$(1+i)^{-n}$
Uniform Series Sinking Fund	to A given F	$(A/F, i\%, n)$	$\frac{i}{(1+i)^n - 1}$
Capital Recovery	to A given P	$(A/P, i\%, n)$	$\frac{i(1+i)^n}{(1+i)^n - 1}$
Uniform Series Compound Amount	to F given A	$(F/A, i\%, n)$	$\frac{(1+i)^n - 1}{i}$
Uniform Series Present Worth	to P given A	$(P/A, i\%, n)$	$\frac{(1+i)^n - 1}{i(1+i)^n}$
Uniform Gradient Present Worth	to P given G	$(P/G, i\%, n)$	$\frac{(1+i)^n - 1}{i^2(1+i)^n} - \frac{n}{i(1+i)^n}$
Uniform Gradient Future Worth	to F given G	$(F/G, i\%, n)$	$\frac{(1+i)^n - 1}{i^2} - \frac{n}{i}$
Uniform Gradient Uniform Series	to A given G	$(A/G, i\%, n)$	$\frac{1}{i} - \frac{n}{(1+i)^n - 1}$

These are also XL Functions

Cash Flows



What is a business worth?

- ◆ A company is a money machine that has cash inputs and cash outputs over time
- ◆ You can translate all future cash flows to a present value
- ◆ Using a given i , you can determine a Present Value of all future cash flows.
- ◆ This Present Value is a measure of what the business is worth

Examples

- ◆ A restaurant produces a steady monthly cash flow of \$10,000. What is the restaurant worth to you? (tip: depends on i)
- ◆ A high tech venture produces an estimated monthly cash flow of \$10,000. What is this company worth to you?
- ◆ If you can be guaranteed a future cash flow what i would you use to determine a present value?
- ◆ If you buy a company for \$1million, and it produces a cash flow of \$10K/month, what is your rate of return on your investment?

Business Decisions impacting Cash Flow

- ◆ There are many ways to acquire the use of assets: BUY, RENT, LEASE, FINANCE (*know the differences*)
- ◆ Examples:
Computers, test equipment, facilities, vehicles, machinery can be acquired in ways that differ greatly with respect to cash flow

At same *interest*, leasing is generally better

Financing Methods

- ◆ Buy: simply pay 100% cash up front
- ◆ Rent: pay a periodic usage fee (don't own)
- ◆ Lease: pay a periodic fee with an option to acquire (and own)
- ◆ Finance: buy using a loan with periodic payments
