IE 5441: Financial Decision Making

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Lecture Hours: Monday 2:20 - 5:20 pm

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Text Book:

Sullivan, Wicks, Koelling

*Engineering Economy*

What are the main points of economic studies?

- The notion of *values* and *costs*.
- Scarcity of the resources: *trade-offs*.
- The impact of the *time* and *space* effects.
- The study of *incentives*.
- The working of *information*.
- The issue of *risks*.

“V I C T O R I S T”
Mankiw’s 10 Principles of Economics:

- People face trade-offs.
- The cost of something is what you give up to get it.
- Rational people think at the margin.
- People respond to incentives.
- Trade can make everyone better off.
Mankiw’s 10 Principles of Economics (continued):

- Markets are usually a good way to organize economic activities.
- Governments can sometimes improve market outcome.
- A country’s standard of living depends on its ability to produce goods and services.
- Prices rise when the government prints too much money.
- Society faces a short-run trade-off between inflation and unemployment.
What is financial economics?

Wikipedia:

Financial Economics is the branch of economics concerned with “the allocation and deployment of economic resources, both spatially and across time, in an uncertain environment”.

Shuzhong Zhang
An example of financial decision making.

Suppose that one wishes to use bonds to match the required cash. There are 10 bonds available for this purpose, each with different maturity dates. The specifications are as follows.

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<th>8</th>
<th>9</th>
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</table>

109 94.8 99.5 93.1 97.2 92.9 110 104 102 95.2

The cash requirements on each year are

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
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<tbody>
<tr>
<td>Cash</td>
<td>100</td>
<td>200</td>
<td>800</td>
<td>100</td>
<td>800</td>
<td>1,200</td>
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</table>
Another example of financial decision making.

You have an initial budget of $500K, and you want to invest in some possible projects. The specifics are as follows:

<table>
<thead>
<tr>
<th>Project</th>
<th>Outlay</th>
<th>Value</th>
<th>BC Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100K</td>
<td>300K</td>
<td>3.00</td>
</tr>
<tr>
<td>2</td>
<td>20K</td>
<td>50K</td>
<td>2.50</td>
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<tr>
<td>3</td>
<td>150K</td>
<td>350K</td>
<td>2.33</td>
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<tr>
<td>4</td>
<td>50K</td>
<td>110K</td>
<td>2.20</td>
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<tr>
<td>5</td>
<td>50K</td>
<td>100K</td>
<td>2.00</td>
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<tr>
<td>6</td>
<td>150</td>
<td>250K</td>
<td>1.67</td>
</tr>
<tr>
<td>7</td>
<td>150K</td>
<td>200K</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Which projects shall we take?
Yet another example of financial decision making.

You are thinking to purchase a flat for rental as an investment. Factors to consider:

- Location? Size? Re-designing and furniture?
- Price range? Down payment?
- # of years mortgage? What kind of mortgage?

To see possible mortgage rates, below is information from one mortgage company:

http://www.amerisave.com/
What is engineering economics?

Wikipedia:

Engineering economics, previously known as engineering economy, is a subset of economics for application to engineering projects. Engineers seek solutions to problems, and the economic viability of each potential solution is normally considered along with the technical aspects.
Principles of Engineering Economics Analysis:

1. Develop the alternatives
2. Focus on the differences
3. Use a consistent viewpoint
4. Use a common measurement
5. Consider all relevant criteria
6. Make uncertainty explicit
7. Revisit your decisions
An example.

You wrecked your car!
You ruled out any other forms of transportation.
A wholesaler offers $2,000 for the wrecked car, and $4,500 if it is repaired. The car has a mileage standing of 58,000 miles.
Your insurance company offers you $1,000 to cover the cost of the accident.
To repair the car costs $2,000.
A newer second-hand car costs $10,000 with a mileage standing 28,000 miles.
A part-time technician offers to repair the car for $1,100, but it takes one month. In the meanwhile you will need to rent a car for $400 per month.

What should you do?

No panic! Follow the engineering economic principles.

**Step 1. Define the problem.**

In this case, the problem is: you need a car.
Step 2. Develop alternatives.

A1: Use additional $7,000 savings to buy the newer car.

A2: Use additional $1,000 to repair the car.

A3: Repair the car, then sell it, and then buy the newer one.

A4: Let the part-time technician repair it and then keep the car.

A5: Let the part-time technician repair the car, and then sell it to buy the newer one.
Step 3. Estimate the cash flows.

A1: -$7,000. (Get the newer car).
A2: -$1,000. (Keep the old car).
A3: -$6,500. (Get the newer car).
A4: -$500. (Keep the old car).
A5: -$6,000. (Get the newer car).

Step 4. Use a consistent criterium.
Dollar value in your perspective.
Step 5. Compare the alternatives.

A1: $10,000-$7,000=$3,000.

A2: $4,500-$1,000=$3,500.

A3: $10,000-$6,500=$3,500.

A4: $4,500-$500=$4,000.

A5: $10,000-$6,000=$4,000.

Step 6. Consider uncertainties and decide.

Choose A5!

Step 7. Monitor and evaluate the decision.

Road test the newer car, and confirm your decision.
Homework Assignment

- Do not forget to put your name and student id number on the worksheet(s).

- Return of the assignment: January 30, 2012, 2:20 pm - 5:20 pm.

End of Chapter 1 of the textbook:

Exercise 1-4

Exercise 1-14