CHAPTER 1

The Fundamentals of Managerial Economics
Chapter One

• Introduction
  – The manager
  – Economics
  – Managerial economics defined

• Economics of Effective Management
  – Identifying goals and constraints
  – Recognize the nature and importance of profits
  – Understand incentives
  – Understand markets
  – Recognize the time value of money
  – Use marginal analysis

• Learning managerial economics
Introduction

• Chapter 1 focuses on defining managerial economics, and illustrating how it is a valuable tool for analyzing many business situations.

• This chapter provides an overview of managerial economics.
  - How do accounting profits and economic profits differ?
    • Why is the difference important?
  - How do managers account for time gaps between costs and revenues?
  - What guiding principle can managers use to maximize profits?
The Manager

- A person who directs resources to achieve a stated goal.
  - Directs the efforts of others.
  - Purchases inputs used in the production of the firm’s output.
  - Directs the product price or quality decisions.
Economics

• The science of *making decisions* in the presence of *scarce resources*.
  – *Resources* are anything used to produce a good or service, or achieve a goal.
  – *Decisions* are important because scarcity implies trade-offs.
Managerial Economics Defined

• The study of how to direct scarce resources in the way that most efficiently achieves a managerial goal.
  – Should a firm purchase components – like disk drives and chips – from other manufacturers or produce them within the firm?
  – Should the firm specialize in making one type of computer or produce several different types?
  – How many computers should the firm produce, and at what price should you sell them?
Economics of Effective Management

• Basic principles comprising effective management:
  – Identify goals and constraints.
  – Recognize the nature and importance of profits.
  – Understand incentives.
  – Understand markets.
  – Recognize the time value of money.
  – Use marginal analysis.
The Nature and Importance of Profits

• A typical firm’s objective is to maximize profits.

• Accounting profit
  – Total amount of money taken in from sales (total revenue) minus the dollar cost of producing goods or services.

• Economic profit
  – The difference between total revenue and the total opportunity cost of producing goods or services.
    – Opportunity cost
      • The explicit cost of a resource plus the implicit cost of giving up its best alternative.
The Role of Profits

• Profit Principle:
  – Profits are a signal to resource holders where resources are most highly valued by society.
Five Forces and Industry Profitability

- **Power of Input Suppliers**
  - Supplier Concentration
  - Price/Productivity of Alternative Inputs
  - Relationship-Specific Investments
  - Supplier Switching Costs
  - Government Restraints

- **Power of Buyers**
  - Buyer Concentration
  - Price/Value of Substitute Products or Services
  - Relationship-Specific Investments
  - Customer Switching Costs
  - Government Restraints

- **Entry**
  - Entry Costs
  - Speed of Adjustment
  - Sunk Costs
  - Economies of Scale
  - Network Effects
  - Reputation
  - Switching Costs
  - Government Restraints

- **Industry Rivalry**
  - Concentration
  - Price, Quantity, Quality, or Service Competition
  - Degree of Differentiation
  - Switching Costs
  - Timing of Decisions
  - Information
  - Government Restraints

- **Substitutes & Complements**
  - Price/Value of Surrogate Products or Services
  - Price/Value of Complementary Products or Services
  - Network Effects
  - Government Restraints

- **Level, Growth, and Sustainability of Industry Profits**
  - Entry Costs
  - Speed of Adjustment
  - Sunk Costs
  - Economies of Scale
  - Network Effects
  - Reputation
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  - Government Restraints

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Understand Incentives

• Changes in profits provide an incentive to resource holders to change their use of resources.

• Within a firm, incentives impact how resources are used and how hard workers work.
  – One role of a manager is to construct incentives to induce maximal effort from employees.
Understand Markets

• Two sides to every market transaction:
  – Buyer (consumer).
  – Seller (producer).

• Bargaining position of consumers and producers is limited by three rivalries in economic transactions:
  – Consumer-producer rivalry.
  – Consumer-consumer rivalry.
  – Producer-producer rivalry.

• Government and the market.
The Time Value of Money

• Often a gap exists between the time when costs are borne and benefits received.
  – $1 today is worth more than $1 received in the future.
    • The opportunity cost of receiving the $1 in the future is the forgone interest that could be earned were $1 received today
  – Managers can use present value analysis to properly account for the timing of receipts and expenditures.
Present Value Analysis 1

• Present value of a *single* future value
  
  – The amount that would have to be invested today at the prevailing interest rate to generate the given future value:

  \[ PV = \frac{FV}{(1 + i)^n} \]

  – Present value reflects the difference between the *future value* and the *opportunity cost of waiting*:

  \[ PV = FV - OCW \]
Present Value Analysis II

• Present value of a stream of future values

\[
PV = \frac{FV_1}{(1 + i)^1} + \frac{FV_2}{(1 + i)^2} + \cdots + \frac{FV_n}{(1 + i)^n}
\]

or,

\[
PV = \sum_{t=1}^{n} \frac{FV_t}{(1 + i)^t}
\]
The Time Value of Money in Action

• Consider a project that returns the following income stream:
  – Year 1, $10,000; Year 2, $50,000; and Year 3, $100,000.
  – At an annual interest rate of 3 percent, what is the present value of this income stream?

\[
P(V) = \frac{10,000}{(1 + 0.03)^1} + \frac{50,000}{(1 + 0.03)^2} + \frac{100,000}{(1 + 0.03)^3}
\]

\[
= \$148,352.70
\]
Net Present Value

• The present value of the *income stream* generated by a project minus the current cost of the project:

\[
NPV = \frac{FV_1}{(1 + i)^1} + \frac{FV_2}{(1 + i)^2} + \cdots + \frac{FV_n}{(1 + i)^n} - C_0
\]
Present Value of Indefinitely Lived Assets

• Present value of decisions that indefinitely generate cash flows:

\[ PV_{\text{Asset}} = CF_0 + \frac{CF_1}{(1 + i)^1} + \frac{CF_2}{(1 + i)^2} + \frac{CF_3}{(1 + i)^3} + \cdots \]

• Present value of this perpetual income stream when the same cash flow is generated \((CF_1 = CF_2 = \cdots = CF)\):

\[ PV_{\text{Perpetuity}} = \frac{CF}{i} \]
Present Value and Profit Maximization

- Profit maximization principle
  - Maximizing profits means maximizing the value of the firm, which is the present value of current and future profits.
Present Value and Estimating Values of Firms I

• The value of a firm with current profits $\pi_0$, with no dividends paid out and expected, constant profit growth rate of $g$ (assuming $g < i$) is:

$$PV_{Firm} = \pi_0 + \frac{\pi_0 (1 + g)}{(1 + i)^1} + \frac{\pi_0 (1 + g)^2}{(1 + i)^2} + \frac{\pi_0 (1 + g)^3}{(1 + i)^3} + \cdots$$

$$= \pi_0 \left( \frac{1 + i}{i - g} \right)$$
When dividends are immediately paid out of current profits, the present value of the firm is (at ex-dividend date):

\[ PV_{Firm}^{Ex-div} = PV_{Firm} - \pi_0 \]

\[ = \pi_0 \left( \frac{1 + g}{i - g} \right) \]
Short-Term versus Long-term Profits

- Short-term and long-term profits principle
  - If the growth rate in profits is less than the interest rate and both are constant, maximizing current (short-term) profits is the same as maximizing long-term profits.
Marginal Analysis

• Given a control variable, \( Q \), of a managerial objective, denote the
  – total benefit as \( B(Q) \).
  – total cost as \( C(Q) \).

• Manager’s objective is to maximize net benefits:
  \[
  N(Q) = B(Q) - C(Q)
  \]
Using Marginal Analysis

• How can the manager maximize net benefits?

• Use marginal analysis
  – Marginal benefit: $MB(Q)$
    • The change in total benefits arising from a change in the managerial control variable, $Q$.
  – Marginal cost: $MC(Q)$
    • The change in the total costs arising from a change in the managerial control variable, $Q$.
  – Marginal net benefits: $MNB(Q)$
    \[
    MNB(Q) = MB(Q) - MC(Q)
    \]
Marginal Analysis Principle I

• Marginal principle
  – To maximize net benefits, the manager should increase the managerial control variable up to the point where marginal benefits equal marginal costs. This level of the managerial control variable corresponds to the level at which marginal net benefits are zero; nothing more can be gained by further changes in that variable.
Marginal Principle II

• Marginal principle (calculus alternative)
  – Slope of a continuous function is the derivative, or marginal value, of that function:

\[ MB = \frac{dB(Q)}{dQ} \]

\[ MC = \frac{dC(Q)}{dQ} \]

\[ MNB = \frac{dN(Q)}{dQ} \]
Marginal Analysis In Action

• It is estimated that the benefit and cost structure of a firm is:

\[ B(Q) = 250Q - 4Q^2 \]
\[ C(Q) = Q^2 \]

• Find the \( MB(Q) \) and \( MC(Q) \) functions.

\[ MB(Q) = 250 - 8Q \]
\[ MC(Q) = 2Q \]

• What value of \( Q \) makes \( NMB(Q) \) zero?

\[ 250 - 8Q = 2Q \Rightarrow Q = 25 \]
Determining the Optimal Level of a Control Variable

Total benefits
Total costs

Maximum total benefits

Slope = MB(Q)

Maximum net benefits

Slope = MC(Q)

Economics of Effective Management

Quantity
(Control Variable)
Determining the Optimal Level of a Control Variable II

\[ N(Q) = B(Q) - C(Q) = 0 \]

Maximum net benefits

Slope = \( MNB(Q) \)
Determining the Optimal Level of a Control Variable III

Marginal benefits, costs and net benefits

Maximum net benefits

$MC(Q)$

$MNB(Q)$

$MB(Q)$

Quantity (Control Variable)
Incremental Decisions

• Incremental revenues
  – The additional revenues that stem from a yes-or-no decision.

• Incremental costs
  – The additional costs that stem from a yes-or-no decision.

• “Thumbs up” decision
  – $MB > MC$.

• “Thumbs down” decision
  – $MB < MC$. 
Learning Managerial Economics

• Practice, practice, practice ...

• Learn terminology
  – Break down complex issues into manageable components.
  – Helps economics practitioners communicate efficiently.
Conclusion

• Make sure you include all costs and benefits when making decisions (opportunity costs).
• When decisions span time, make sure you are comparing apples to apples (present value analysis).
• Optimal economic decisions are made at the margin (marginal analysis).