Managerial Economics & Business Strategy

Session 1:
The Fundamentals of Managerial Economics

Welcome to Managerial Economics, Session 1. Lets begin the first of many exciting sessions in this course.

Overview

The Economics of Effective Management
  – Identify Goals and Constraints
  – Recognize the Role of Profits
  – Five Forces Model
  – Understand Incentives
  – Understand Markets
  – Recognize the Time Value of Money
  – Use Marginal Analysis

So today we will be taking an economics perspective on effective management. The main topics covered are goals and constraints of firms, profits, five forces model, time value of money and marginal analysis.

Managerial Economics

- Manager
  - A person who directs resources to achieve a stated goal.
- Economics
  - The science of making decisions in the presence of scare resources.
- Managerial Economics
  - The study of how to direct scarce resources in the way that most efficiently achieves a managerial goal.

So what is Managerial economics. Simply put managerial economics gives tools for analyzing business situations that enables you to become an effective manager. Now effective management requires a manager. Who is a manager? A manager is a person who directs resources to achieve a stated goal.

Coming back to the economics part of it. Economics is decision-making under scarcity and scarcity is having limited resources. Lets take an example, such as time. Coming to lecture involves the use of your time. Time available to you in a day is a limited resource, it is not unlimited. Hence, you have to decide whether to attend the lecture or work on an assignment at home. In other words, you have to give up on something to come to this lecture. Similarly, a manager has to decide how to allocate scarce resources. If a soft drink company spends a lot on advertising then it has less resources to spend on product development. Effective management requires making these choices.

One side point here. Our focus in this course is economic tools required for effective management. There are other skills needed too like communication skills, a good temperament etc. I don't deny this but the scope here is just economics tools.

Identify Goals and Constraints

- Sound decision making involves having well-defined *goals*.
  - Leads to making the "right" decisions.
- In striking to achieve a goal, we often face *constraints*.
  - Constraints are an artifact of scarcity.

So what kind of tools can we give people to become good managers. To make good decisions, firstly, a manager must clearly identify goals and constraints. Since resources are limited every manager faces constraints. For example, as a manager of a restaurant I may want to make my restaurant the most popular in town and gain the greatest market share. Constraints faced in this exercise might include not having enough capital to rent a popular location. Thus, in this case I may have to revise the goal.

Economic vs. Accounting Profits

- Accounting Profits
  - Total revenue (sales) minus dollar cost of producing goods or services.
  - Reported on the firm's income statement.
- Economic Profits
  - Total revenue minus total opportunity cost.

Rather than having unachievable or rather dreamy goals a effective manager will most likely want to maximize profit or the value of the firm. So as a restaurant manager I have to maximize profit within the resource constraint. I am ignoring value of the firm because we are assuming that maximizing profit is essentially equal to maximizing the value of the firm. We will come back to this point, but for now I want you to take this assumption.

Now what is profit? You all are probably thinking who does not know that? Profit is Total revenue-Total cost. Not entirely true in economics. We are all familiar with Accounting profit, which is total revenue minus total cost of producing goods or services. In economics we take a slightly different perceptive. Economic profit is total revenue minus total opportunity cost.

Opportunity Cost

- **Accounting Costs**
  - The explicit costs of the resources needed to produce goods or services.
  - Reported on the firm's income statement.
- **Opportunity Cost**
  - The cost of the explicit *and* implicit resources that are foregone when a decision is made.
- **Economic Profits**
  - Total revenue minus total opportunity cost.

Here we have an extremely important new term-opportunity cost. Opportunity cost is the value of the next best alternative forgone. It includes both implicit and explicit costs in its valuation. Accounting profit, on the other hand, only includes explicit costs. Hence, economic costs are most likely to be greater than accounting costs.

Lets take a simple examples. I get paid to $200 per hour for this lecture (I wish!). My next best alternative to this lecture was taking tutorials paying me $100 per hour. Therefore, the value of next best alternative is $100. Here $100 is the opportunity cost of my time and an implicit cost. Lets say the explicit costs are zero. Will I take this lecture? Yes of course! Lets modify this a bit. My costs of getting to the lecture are $50. Making the opportunity cost $150 but still not changing the outcome.

Coming back to my restaurant, opportunity cost of my restaurant will include both explicit cost (like costs of supplies) + the value of my time if I am running the restaurant. Which is again different from accounting costs.

Task

1) Which of the following is an implicit cost to a firm that produces a good or service?
    A. labor costs.
    B. costs of operating production machinery.
    C. foregone profits of producing a different good or service.
    D. costs of renting or buying land for a production site.

2) Which of the following is an implicit cost of going to college?
    A. tuition.
    B. cost of books and supplies.
    C. room and board.
    D. foregone wages.

3) The opportunity cost of receiving ten dollars in the future as opposed to getting that ten dollars today is:
    A. the foregone interest that could be earned if you had the money today.
    B. the taxes paid on any earnings.
    C. the value of $10 relative to the total income of that person.
    D. the value of $10 relative to the total income of all persons.

I will break while u all read and attempt Task1.

Task

- Jaynet spends $20,000 per year on painting supplies and storage space. She recently received two job offers from a famous marketing firm—one offer was for $100,000 per year, and the other was for $90,000. However, she turned both jobs down to continue a painting career. If Jaynet sells 20 paintings per year at a price of $10,000 each:

a. *What are her accounting profits?*

b. *What are her economic profits?*

The break continues for Task 2.

The Five Forces Framework

- Threat of New Entrants
- Bargaining Power of Suppliers
- Bargaining Power of Buyers
- Threat of Substitute Products or Services
- Rivalry among existing Competitors

Porter, ME, 2008, The five competitive forces that shape strategy, *Harvard Business Review, January.*

Since profit is the main goal of firms, how do we identify the most profitable sector or industries? Porter's Five Forces model is a useful tool for analysis at the firm level and at the industry level. You are encouraged to look up the reference to Porter provided on the slide for more detail. It is a journal article and can be accessed through the library online resources.

According to Porter competition faced by firms in an industry determines **potential** profit. Actual profit may of course differ at the implementation stage. The nature and degree of competition is influenced by 'Five Forces': the threat of new entrants; the bargaining power of customers; the bargaining power of suppliers; the threat of substitute products/services; and the degree of competition inside the industry

Porter argues that the profit of an industry depends on the *collective* strength of these five forces.

So for this model: the more intense the strength of these forces, the lower the profit; and vice versa. Please keep this in mind!

Lets talk about each of the five forces in turn. I will go through this quickly as the reference reading or any other internet search on this topic is fairly straightforward.

The Five Forces

- New Entrants
  - If barriers to entry are low (e.g. Parap Markets) the threat of entrants is serious
  - If barriers to entry are high (e.g. car manufacturing) the threat is much lower but is still present

If a new firm enters the market, it increases competition and places pressure on the firms already present.

The more new firms entering the market the lower the profit. For example, the growing presence of fast food chain Oporto's threatens the profitability of Nandos in the Australian market since both specialise in spicy chicken meals. Hence, firms in markets with low barriers to entry are under more threat. Factors affecting barriers of entry include capital requirements and government regulation. For instance, to give MacDonald's a serious threat from a new company requires heavy investments in things such as distribution channels and advertising. Not something all of us can achieve! In other words McDonald's is pretty safe.

The Five Forces

- Threat of Substitute Products or Services

  This threat is serious if:
  - Industries are already earning high profits (e.g. oil vs. gas power generation)
  - The buyers switching cost are low (e.g blue pen from campus bookstore vs. blue pen from Coles)

If two products are the similar enough to replace each other they are substitutes. Examples include:

> Tea and coffee

> Butter and margarine

> Petroleum and natural gas (for energy production)

If more firms with similar products enter then industry profitability goes down. In sectors such as high profit industries and industries where buyers can easily switch products attract more firms. Think of mobiles as a substitute to Telstra home phones.

The Five Forces

- Bargaining Power of Suppliers

  This threat is serious if:
  - The industry is dominated by a few suppliers
  - If the purchasing firm is not a major customer
  - If it doesn't have to compete against other firms (e.g. Telstra copper lines)
  - If the product produced is unique/patented (suppliers providing patented drugs to hospitals)
  - High switching costs

The next force is Bargaining Power of Suppliers. Here we are talking about the input suppliers. For example, the farmer is the supplier of milk to the cheese producer. Industry profits tend to be low if suppliers have power to set their input prices. The suppliers will have more power if they are more concentrated than the industry, if one supplier can supply to many industries, there are no substitutes for what supplier group provides (example Telstra's copper lines), suppliers provide unique goods (e.g suppliers providing patented drugs to hospitals) and huge costs are involved in changing suppliers.

The Five Forces

- Bargaining Power of Buyers

  This threat is serious if:
  - The buyer purchases in bulk (e.g. supermarkets)
  - If the product is undifferentiated (e.g. milk)
  - If there is little difference in price between products (price of vegetables in Coles and woolworths)
  - The product simply doesn't matter for the buyer (e.g. the tag on a shirt)
  - Low switching costs

Industry profits also tend to be low if buyers have power to negotiate favourable terms for products or services produced in the industry. The bargaining power of buyers is high in cases such as:

if buyer purchases in bulk (e.g. Supermarkets), if the product is undifferentiated (e.g. Milk), if there is little difference in price between products (price of vegetables in Coles and woolworths) and buyers face low switching costs.

The Five Forces

- Rivalry among existing Competitors

  This threat is serious if
  - Competitors are numerous/similar sized
  - Industry growth is slow
  - Fixed costs are high/goods are perishable
  - Exit barriers are high
  - There is diversity in the industry

The next force I want to discuss is "Rivalry among existing Competitors"

Before we discuss rivalry among existing competitors we need to understand what is competition? Competition is (as defined by Oxford Dictionary):

> "the activity or condition of striving to gain or win something by defeating or establishing superiority over others"

Examples include competition between banks, between coffee shops, mobile companies.

The threat of rivalry among existing competitors is serious if Competitors are numerous/similar sized, Industry growth is slow (leading to more fighting), fixed costs are high (example mining), goods are perishable (vegetables), Exit barriers are high (think of manufacturing firms here with specialised equipment) and there is diversity in the industry.

To summarise understanding Porter's five forces model helps managers to see the big picture and contributes in assessing suitable business strategies by analysing competitive forces and potential for profit.

The Time Value of Money

- Present value (*PV*) of a future value (*FV*) lump-sum amount to be received at the end of "*n*" periods in the future when the per-period interest rate is "*i*":

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

- Examples:
  - Lotto winner choosing between a single lump-sum payout of $104 million or $198 million over 25 years.
  - Determining damages in a patent infringement case.

Another tool essential for managerial decisions is time value of money. This is so because the timing of many decisions entails a gap between the time when the costs of a project are borne and the time when the benefits are received. For this reason it is essential to calculate present value of future benefits.

So first lets see if $1 today is as valuable as a $1 in 20 years. Clear answer is no. $1 today can be invested and retrieved in 20 years with interest. The value will be more than double at 5% interest.

So this raises the question that if u know your benefit on a certain investment will be x in the future, how do u decide whether it is worth it. So, we essentially calculate the present value of a future amount. Future value defined as FV is a lump-sum amount to be received at the end of n-periods in the future at interest rate i. The formula for present value is simply Present Value or PV=Future Vaue over (1+i) to the power n.

The present value of future amounts is heavily affected by interest rate. If interest is high, the present value of a future amount is low. On the other hand if interest is low, the present value of future amount is high.

Present Value vs. Future Value

- The present value (PV) reflects the difference between the future value and the opportunity cost of waiting (OCW).
- Succinctly,

$$PV = FV - OCW$$

- If $i = 0$, note $PV = FV$.
- As i increases, the higher is the OCW and the lower the PV.

Another way to think about the present value (PV) is the difference between the future value and the opportunity cost of waiting (OCW). If interest rate is zero the present value=future value. Hence, interest rate is the opportunity cost of waiting!

Present Value of a Series

- Present value of a stream of future amounts (FV_t) received at the end of each period for "n" periods:

$$PV = \frac{FV_1}{(1+i)^1} + \frac{FV_2}{(1+i)^2} + \ldots + \frac{FV_n}{(1+i)^n}$$

- Equivalently,

$$PV = \sum_{t=1}^{n} \frac{FV_t}{(1+i)^t}$$

We can modify the formula for a list of payments. Say the Future amounts varied. Say you got 105 in year 1, 110 in year 2 etc. In this case the Present value is simply equal to FV1 in year 1 over (1+i) to the power of 1 plus FV2 in year 2 over (1+i) to the power of 2 and so on. It will be very useful if you could pause and write down the formula without looking at the slide.

Net Present Value

- Suppose a manager can purchase a stream of future receipts (FV_t) by spending "C_0" dollars today. The NPV of such a decision is

$$NPV = \frac{FV_1}{(1+i)^1} + \frac{FV_2}{(1+i)^2} + \ldots + \frac{FV_n}{(1+i)^n} - C_0$$

Decision Rule:

If   NPV < 0: Reject project

NPV > 0: Accept project

Now that we know PV and FV, I can demonstrate its usefulness in managerial decisions. Lets imagine a manager can purchase a stream of future receipts or a stream of future amounts by spending "C_0" dollars today. How do I decide whether I should spend the "C_0" dollars today. Simply calculate the The *Net Present Value* of such a decision by subtracting current costs of the project from present value. The formula for Net Present Value is equal to FV1 in year 1 over (1+i) to the power of 1 plus FV2 in year 2 over (1+i) to the power of 2 and so on subtracted from the costs. If NPV>0 Accept project, if NPV<0 Reject project

Task

- What is the maximum amount you would pay for an asset that generates an income of $150,000 at the end of each year for five year period if the opportunity cost of using funds is 9%?

Hint: In this case, opportunity cost is interest rate.

I will break while u all read the above questions in Task 3 carefully and calculate the right answer.

Marginal (Incremental) Analysis

- Control Variable Examples:
  - Output
  - Price
  - Product Quality
  - Advertising
  - R&D
- Basic Managerial Question: How much of the control variable should be used to maximize net benefits?

Another useful tool for managers is marginal analysis. Marginal analysis helps ascertain the amount of a certain activity. Something that marginal analysis can address is how much to produce? Remember the aim is to maximize profit, not revenue. Produce as much as possible is, therefore, not the right answer- because we have not taken into account the costs! One way to get the right answer is by going through the marginal analysis.

Net Benefits

- Net Benefits = Total Benefits - Total Costs
- Profits = Revenue - Costs

Before we get into marginal analysis lets revisit the issue of profit. Lets think of economic profit here which is total revenue minus opportunity cost. We can capture this idea in general terms and express this as net benefits= total benefits minus total costs. Total costs can be opportunity of cost of production and total benefits can be revenue arising from sale of q items or p*q. The formula of net benefits can also be applied in other contexts.

Marginal Benefit (MB)

- Change in total benefits arising from a change in the control variable, Q:

$$MB = \frac{\Delta B}{\Delta Q}$$

- Slope (calculus derivative) of the total benefit curve.

Two topics that we will cover in marginal analysis is marginal benefit and marginal costs.

So what is marginal benefit? Marginal benefit is additional benefit associated with one more unit. To calculate marginal benefit you simply calculate change in total benefit (represented as B on the slide) over change in Q.

In a firms case the extra revenue received from selling one more unit is the marginal benefit.

Marginal Cost (MC)

- Change in total costs arising from a change in the control variable, Q:

$$MC = \frac{\Delta C}{\Delta Q}$$

- Slope (calculus derivative) of the total cost curve.

Marginal cost is similar to marginal benefit. To calculate marginal cost you simply calculate change in total cost (represented on the slide as C) over change in Q.

In a firm's case the extra cost associated with selling one more unit is the marginal cost.

Some knowledge of calculus will be very useful for MB and MC analysis. For example MC= derivative of TC with respect of Q. So basically you differentiate TC with respect to Q. This is essentially equal to a change TC over a change in Q.

Task

Loaves	TC	MC
0	20	
1	22	
2	26	
3	32	
4	40	
5	50	
6	62	
7	76	

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Lets break to do Task 4.

Task

Suppose the total benefit derived from a given decision, Q, is $B(Q) = 25Q - Q^2$ and the corresponding total cost is $C(Q) = 5 + Q^2$, so

- that $MB(Q) = 25 - 2Q$ and $MC(Q) = 2Q$.
- a. What is total benefit when $Q = 2$? $Q = 10$?
- b. What is marginal benefit when $Q = 2$? $Q = 10$?
- c. What level of Q maximizes total benefit?
- d. What is total cost when $Q = 2$? $Q = 10$?
- e. What is marginal cost when $Q = 2$? $Q = 10$?

Continue break for Task 5.

Marginal Principle

- To maximize net benefits, the managerial control variable should be increased up to the point where $MB = MC$.
- $MB > MC$ means the last unit of the control variable increased benefits more than it increased costs.
- $MB < MC$ means the last unit of the control variable increased costs more than it increased benefits.

From doing the above exercises it essentially follows that to maximize net benefits, marginal benefit should equal marginal costs. If $MB > MC$ means the last unit of the control variable increased benefits more than it increased costs. So it pays to produce more. On the other hand if $MB < MC$ means the last unit of the control variable increased costs more than it increased benefits. So it pays to produce less. Thus the best point is where MB=MC.

Example- Table 1

Q	Total Benefits	Total Costs	Net Benefit	Marginal benefit	Marginal cost
0	0	0	0		
1	90	10	80	90	10
2	170	30	140	80	20
3	240	60	180	70	30
4	300	100	200	60	40
5	350	150	200	50	50
6	390	210	180	40	60
7	420	280	140	30	70
8	440	360	80	20	80
9	450	450	0	10	90
10	450	550	-100	0	100

Lets take another example here. Table 1 above shows q, which is the quantity. Total benefits and total costs are given. Column 4, Net Benefits, should now be easy enough to calculate. Net Benefits is TB-TC. Marginal benefit is calculated by change in total benefits over change in quantity. Lets do that now. For change in Q from 0 to 1 we have 90-0/1=90; For change in Q from 1 to 2 we have 170-90/1=80 and so on. Similarly we can calculate marginal costs. Marginal cost is calculated by change in total costs over change in quantity. For change in Q from 0 to 1 we have 10-0/1=10; For change in Q from 1 to 2 we have 30-10/1=20 and so on. The optimal point where net benefits is maximised is at five units at 200 and MB=MC=50.

The Geometry of Optimization: Total Benefit and Cost

Total Benefits & Total Costs

Costs

Benefits

Slope =MB

B

C

Slope = MC

Q*

Q
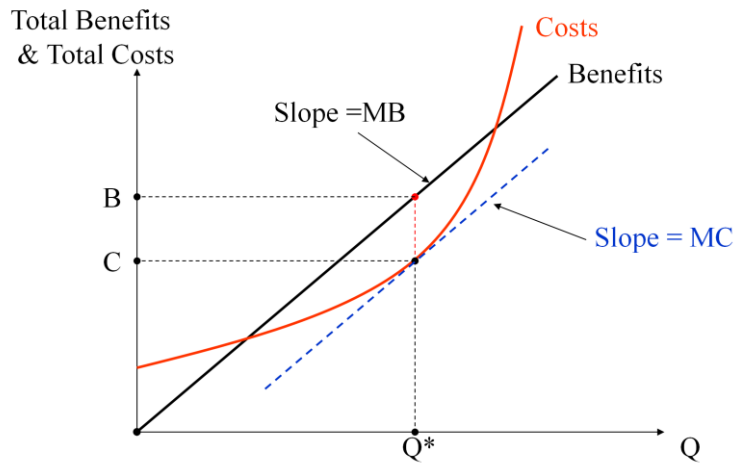
Another way to look at the above principles is to examine the above diagram. In the case above Q* is the optimal output as it is the point where the distance between TB and TC is the maximum. The slope of the cost curve is also MC and slope of the benefits curve is also Marginal Benefit. At Q* these slopes are equal or MB=MC.

Conclusion

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

To summarize, an effective manager is careful to include:

all costs and benefits when making decisions. And calculate the costs using the opportunity cost method.

Recognizes time value of money

And optimizes uses marginal analysis