

Module 1

Introduction to Managerial Economics

Introduction

The application of economic theory and its stock of analytical tools to everyday activities is no easy matter, as many frustrated students of economics have found out. “The economic theory is very elegant, but how do I apply it to real-life problems?” Because this is a legitimate question for which there are no easy answers, the branch of economic study called managerial economics emerged in the 1940s to bridge the gap between theory and practice. Managerial economics today is an integral part of both undergraduate and graduate programmes in business administration. It is also a popular offering in the curricula of other professional schools, such as those in engineering, public administration, public health, law, medicine, and urban and regional planning. This is because the principles and techniques of managerial economics apply not only to profit-seeking organisations, but to any organisation that wants to optimise the use of its resources, whether that organisation is domestic or international.

Upon completion of this module you will be able to:



Outcomes

- *demonstrate* knowledge of the scope of managerial economics.
- *distinguish* between two different approaches to economics: positive and normative.
- *analyse* the value of the firm.
- *explain* the nature of decision-making under risk and uncertainty.
- *evaluate* the implications of the firm’s different objectives.



Terminology

Managerial economics:	A branch of economics that applies microeconomic analysis to specific business decisions. As such, it bridges economic theory and economics in practice.
Microeconomics:	The economic forces that influence the decisions made by individual consumers, firms and industries.
Macroeconomics:	Aggregate economic conditions.



Positive economics:	Describes how economic agents or economics systems do operate within the economy or society.
Normative economics:	Prescribes how economic agents or systems should operate to attain desired objectives.

The nature of managerial economics

This section introduces you to the subject and then proceeds to build the foundation necessary for decision-making under uncertainty. Decision-making under uncertainty is a central theme of managerial economics discussed in Module 4. In this section, we first examine the definition and scope of managerial economics. This leads to a discussion of the use of ‘models’ in managerial economics. We will see that verbal, graphical, and algebraic models depicting the behaviour of consumers and business firms can be of substantial assistance in decision analysis.

We will then discuss the issue of decision-making under uncertainty. In business the outcome of a decision is usually far from certain (at the time the decision is taken) because the decision maker has incomplete information and the outcome depends on the simultaneous behaviour of rival firms and other factors influencing the managerial cost and demand conditions. When the outcome of a decision is not predictable with certainty, we say that the decision is made under conditions of risk or uncertainty.

To some, managerial economics is the application of economic theory (particularly microeconomic theory) to problems concerning the optimal allocation of economic resources. Other scholars view managerial economics as applied microeconomics, an approach requiring the integration of principles and practices from other functional areas such as accounting, finance, marketing and management. Still other scholars see economics as a link between economic theory and decision science. In this capacity it is to contribute to sound decision-making not only in business-oriented profit-making organisations, but also in government agencies and non-profit organisations.

Economic theory and managerial economics

Economic theory traditionally is divided into two broad subfields: microeconomics and macroeconomics. *Macroeconomics* focuses on aggregate economic conditions. Those are conditions that set the environment within which a business operates. On the other hand, *microeconomics* focuses on the economic forces that influence the decisions made by individual consumers, firms and industries.

Macroeconomics is concerned with the economy as a whole. It is thus concerned with aggregate demand and aggregate supply. Aggregate

demand is the total amount of spending in the economy, whether by consumers, by overseas customers for our exports, by the government, or by firms when they buy capital equipment or stock up on raw materials. Aggregate supply is the total national output of goods and services.

Microeconomics is concerned with the individual parts of the economy. It is concerned with the demand and supply of *particular* goods and services and resources: cars, butter, clothes and haircuts; electricians, secretaries, blast furnaces, computers and coal. The crux of microeconomic influences on business decision-making is the answer to the two-part question: how much should the firm produce, and how much should it charge for this output?

Since microeconomic theory deals with topics that are more closely related to the firm's behaviour in resource allocation (namely, consumer behaviour, production and cost analysis, market structure and pricing, profit planning and finance), it makes a major contribution to managerial economics. However, it does not operate in a vacuum. Its environment is in the global setting, which both affects and is affected by the activities of individuals who are producers and consumers all over the world.

Positive versus normative economics

In economics, the distinction is made between those areas that are positive and those that are normative. Positive economics is descriptive: it describes how economic agents or economic systems *do operate* within the economy or society. Normative economics, on the other hand, is prescriptive: it prescribes how economic agents or systems *should operate* to attain desired objectives.

Managerial economics is primarily normative, since it seeks to establish rules and principles to be applied in decision-making to attain the desired objectives. But managerial economics must start from a positive perspective: we must always be mindful of the actual practices in the business or institutional environment. For example, if firms choose their price level by applying a mark-up to their direct costs rather than by equating marginal revenue and marginal costs as implied by microeconomic principles, managerial economists should seek the optimal level of the mark-up rather than making speeches to deaf ears about marginalist principles. The approach taken in this course is to integrate business practice with economics. By reference to the microeconomic principles, the business practice can be evaluated in terms of its efficiency in attaining the desired objectives.

Central to the study of managerial economics is the concept of profit. Profit is defined as the excess of revenues over costs. For a non-profit institution, an excess of revenues over costs is called a surplus. If costs exceed revenues there is a loss, known as a deficit in the non-profit sector. No firm or organisation, not even the national government, can incur losses or deficits forever. The objective of a business firm usually requires profit-maximisation over its time horizon, which may be short-term or long-term depending on the firm and its circumstances. Non-



profit institutions typically do not seek to make a surplus but wish to spend their available funds to maximum effect. The decision problems facing business and non-business institutions are therefore essentially similar, involving revenue enhancement if possible and cost control wherever possible. The attainment of a profit (or the avoidance of a deficit) is seen as a measure of managerial effectiveness.

The use of models in managerial economics

Economic theories seek to predict and explain economic behaviour. Economic theories usually begin with a *model*. This abstracts from the details surrounding an event and seeks to identify a few of the most important determinants of the event. For example, the theory of the firm assumes that the firm seeks to maximise profits, and on that basis it predicts how much of a particular commodity the firm should produce under different forms of market structure or organisation. While the firm may have other (multiple) aims, the profit-maximisation model accurately predicts the behaviour of firms, and, therefore, we accept it. Thus, methodology of economics (and science in general) is to accept a theory or model if it predicts accurately and if the predictions follow logically from the assumptions.

Managerial economics is also closely related to the decision sciences. These utilise the tools of mathematical economics and econometrics to construct and estimate decision models aimed at determining the optimal behaviour of the firm (how the firm can achieve its goals most efficiently). Specifically, mathematical economics is used to formalise (to express in equational form) the economic models postulated by economic theory. Econometrics then applies statistical tools (particularly regression analysis) to real-world data to estimate the models postulated by economic theory and for forecasting.

Throughout this course you will see hundreds of special words that comprise the jargon of economics, dozens of graphs, and more than a few algebraic equations. The jargon, graphs and equations are used to model relationships that exist between and among variables and to facilitate analysis and decision-making.

In mathematical economics, economic relationships are expressed in mathematical form thereby rendering them amenable to empirical testing or other modelling techniques. In addition to making the research for solutions easier, mathematical representations often permit insights into problems that would easily be missed in a purely descriptive approach.

The theory of the firm

In this section, we examine first the reason for the existence of firms and their principal functions. Then we define the value of the firm and the constraints under which it operates. Finally, we discuss the limitations of the theory of the firm. This is a very important section since the theory of the firm is the centrepiece and central theme of managerial economics.

A firm is an organisation that combines and organises resources for the purpose of producing goods and/or services for sale. There are hundreds of thousands of firms in a country such as Canada. These include proprietorships (firms owned by one individual), partnerships (firms owned by two or more individuals), and corporations (owned by stockholders). Firms produce almost 80 per cent of all goods and services consumed in Canada. The remainder is produced by the government and not-for-profit organisations, such as museums and foundations.

Firms exist because it would be very inefficient and costly for entrepreneurs to enter into and enforce contracts with workers and owners of capital, land and other resources for each separate step of the production and distribution process. Instead, entrepreneurs usually enter into longer-term, broader contracts with labour to perform a number of tasks for a specific wage and fringe benefits. Such a general contract is much less costly than numerous specific contracts and is highly advantageous both to the entrepreneurs and to the workers and other resource owners. By internalising many transactions (by performing many functions within the firm), the firm also saves on sales taxes and avoids price controls and other government regulations, which apply only to transactions among firms.

On the other hand, firms do not continue to grow larger and larger indefinitely because of limitations on management ability to effectively control and direct the operation of the firm as it becomes larger and larger. It is true that up to a point, a firm can overcome these internal disadvantages of large size or diseconomies of scale by establishing a number of semi-autonomous divisions (that is, by decentralising). Eventually, however, the increased communication traffic generated, coupled with the further and further distancing of top management from the operation of each division imposes sufficient diseconomies of scale to limit the growth of the firm. Furthermore, the firm will reach a point where the cost of supplying additional services within the firm exceeds the cost of purchasing these services from other firms. An example is provided by some highly technical (legal, medical, or engineering) service that the firm may need only occasionally.

The function of firms, therefore, is to purchase resources or inputs of labour, capital and raw materials in order to transform them into goods and services for sale. Resource owners (workers and owners of capital, land and raw materials) then use the income generated from the sale of their services or other resources to firms to purchase the goods and services produced by firms. The circular flow of economic activity is thus



complete. In the process of supplying the goods and services that society demands, firms provide employment to workers and pay taxes that government utilises to provide services (such as national defence, education and fire protection) that firms could not provide at all or as efficiently.

The objective and value of the firm

A number of models have been advanced to explain the behaviour of business organisations and their managers in terms of their goals and objectives. These models include the profit-maximisation model, the sales-maximisation model, and the agency model.

It has long been customary for economists to assume that the primary goal of any type of organisation is to maximise the benefits provided by the organisation's operations in relation to its costs. In the case of a business organisation, the benefits it seeks are profits. Since our economic system permits firms in unrelated industries to earn all they can, it was originally proposed that the firm is best described by a profit-maximisation model derived from the theory of the firm set forth in microeconomic studies.

Earlier versions of the profit-maximisation model concentrated on decision-making to maximise short-run profits, that is, to maximise short-run total revenue minus total cost. In later versions of the model, the goal of the firm is assumed to be the maximisation of the *value of the firm* or *wealth* in the long run. This is so because many decisions involve cash flows extending beyond the present period. When choosing among alternative decisions, it is important to distinguish between revenues that are received immediately and those received at some later date. Since the firm's value in the long run depends upon a stream of future profits that may or may not actually materialise as expected, the model has been expanded to include the time value of money (the present value of future profits) and the concepts of risk. To understand the model, the student must have a clear understanding of the concept of present value.

Note that a dollar received today is worth more than a dollar received next year, because a dollar held today may be deposited in a bank and at the end of one year it will be worth the original dollar plus the interest earned on that dollar. Hence, if the interest rate is, say, 10 per cent, a dollar held today will be worth \$1.10 one year from today. Looking at this from the reverse aspect, a dollar earned one year from today has *present value* of only about 91 cents because 91 cents would grow to a dollar (at 10 per cent interest) within the year.

The concept of present value is based upon the principle of compound interest. Suppose \$1 is invested today at i per cent interest per annum: then one year from today the accumulated amount B_1 , which is principal plus interest, will be:

$$B_1 = \$1 + (\$1 \times i)$$

$$B_1 = \$1(1 + i)$$

If the investment accumulates interest over two years, two years from now, it will be B_2 , where:

$$B_2 = \$1(1+i)(1+i) = \$1(1+i)^2$$

The reverse of compounding is called discounting. If we expect B_2 to equal $\$1(1+i)^2$ two years from now, it is worth $\$1$ now when discounted at i per cent; that is:

$$\text{or } \frac{\$1(1+i)^2}{(1+i)^2} = \$1$$

$$\frac{B_2}{(1+i)^2} = \$1$$

Therefore, the firm's value in the long run is the present value of a stream of future (expected) profits as follows:

$$PV = \frac{\pi_1}{(1+i)} + \frac{\pi_2}{(1+i)^2} + \dots + \frac{\pi_n}{(1+i)^n} = \sum_{t=1}^n \frac{\pi_t}{(1+i)^t} \quad (1)$$

where PV is the present value of all expected future profits of the firm, $\pi_1, \pi_2 \dots \pi_n$ represent the expected profits in each of the n years considered, and i is the appropriate discount rate used to find the present value of future profits, Σ refers to 'the sum of,' and t refers to time taking on values from 1 to n .

The introduction of the time dimension in equation (1) allows for the consideration of uncertainty. For example, the more uncertain is the stream of expected future profits, the higher is the discount rate that the firm will use, and, therefore, the smaller is the present value of the firm.

Since profits are equal to total revenue (TR) minus total costs (TC), this equation can be rewritten as:

$$\text{Value of firm} = PV = \sum_{t=1}^n \frac{TR_t - TC_t}{(1+i)^t} \quad (2)$$

This equation provides a unifying theme for the analysis of managerial decision-making and, indeed, for this entire text. Specifically, TR depends on sales or the demand for the firm's output and the firm's pricing decisions. These are the major responsibilities of the marketing department. The TC depends on the technology of production and resource prices. These are the major responsibilities of the production and personnel departments. These are discussed in detail in the following section. The discount rate (i) depends on the perceived risks of the firm and on the cost of borrowing funds. These are the major responsibilities of the finance department.

Note that an important question is: what is the appropriate discount rate? The decision maker must choose the discount rate quite carefully, since use of an inappropriate discount factor could cause a poor decision to be



made when the future profit streams of alternative decisions differ markedly.

If the same amount of profit is expected every year, the problem of maximising the stream of profits reduces simply to the problem of maximising π . The present value of a stream of equal payments may be calculated as follows:

$$PV = \pi \left[\frac{1 - (1+i)^{-n}}{i} \right] \quad (3)$$

where n is the number of years. The expression in brackets is called the discount factor.

Certainty, risk and uncertainty

The state of information under which a decision is made has important implications for the predictability of the outcome of that decision. If there is full information, the outcome of a decision will be foreseen clearly and unambiguously. In this situation (of certainty) the firm can accurately predict the outcome of each of its decisions. When there is less than full information, however, the decision maker may foresee several potential outcomes to a decision and, therefore, will be unable to predict consistently which outcome will actually occur. In this case we say that the individual or firm is operating under conditions of risk and uncertainty.

Certainty exists if the outcome of a decision is known in advance without a shadow of a doubt. Under conditions of certainty, a decision leads to a single possible outcome, which is perfectly foreseen. *Uncertainty* is involved when a decision might lead to one of several possible outcomes and the exact outcome is not known in advance. Instead, there will be a probability distribution of possible outcomes, which the decision maker must identify.

When the future return is certain, the risk-free discount rate i is appropriate. If the future return is not certain, we must use the risky discount rate, say r , where r equals i plus a risk premium to compensate for the risk involved. The magnitude of r reflects the degree of risk. It is the firm's capitalisation rate or cost of capital, that is, the rate of return required by an investor after giving due consideration to the firm's business and financial risk.

Risk can be regarded as a subcategory of uncertainty in which the probabilities of each outcome can be assigned on an objective basis. Risk is defined as a state of knowledge in which each alternative leads to one of the set of specific outcomes, with each outcome occurring with a probability that is known objectively to the decision maker. For example, risk is involved when one flips a coin, throws dice, or plays a hand of poker. The probability of flipping a coin and having it land 'heads' is 1/2, since there are only two possible outcomes (ruling out the coin landing on its edge), and each is equally likely to occur, given an unbiased coin.

Similarly, when one throws two dice, the probability that they will turn up 'snake eyes' or any other pair of numbers, is $1/6 \times 1/6 = 1/36$.

In each of the preceding illustrations, the probability of each outcome is known a priori. That is, on the basis of known mathematical and physical principles, we can calculate the probable incidence (or proportion) of each possible outcome in the total number of outcomes associated with a number of trials. That is, if we toss a coin a number of times, we expect to observe 'heads' about half the time. Although 'heads' might appear three or even four times out of the first four tosses of the coin, given a sufficiently large number of trials, the proportions will converge on $1/2$ for each of the two possible outcomes.

Limitations of the profit-maximisation model

The principles governing the profit-maximisation model may tell us much about how firms would like to behave, how they would like to make investment decisions, and how they would prefer to time their activities. In a world in which the timing of investments is crucial to success, the profit-maximisation model can give important insights into the probable behaviour of firms. But the profit-maximisation model, like all models, is a simplified, abstract version of reality. In the real world, there are a number of complexities that limit its descriptive adequacy. This is because in addition to a lack of complete information, (1) it requires the firm to predict accurately the magnitude and timing of a stream of profits to be realised in the future – something that is difficult to do under the best of circumstances and impossible under the worst – and (2) there are many legal, ethical and social constraints that limit a firm's all-out pursuit of profit. Within this network of constraints, the firm seeks optimal profit.

This means that firms do not necessarily seek maximum profits but instead seek to balance their desire for profit with other goals and objectives – short-run and long-run, economic and non-economic. Achievement of these other goals as well as profits provides maximisation of benefits, and this is not necessarily the same as maximisation of profit.

Recognition of this fact has led to a number of alternative models that state that the motivation of the firm is something other than maximisation of profit. These models, which are of considerable importance to the understanding of the behaviour of firms, can be grouped into several categories including: *Sales-maximisation* models and the *Agency* model.

Sales (revenue) maximisation model

The sales-maximisation model is probably the best-known alternative to the profit-maximisation model. This is because it is easily understood and because it can be supported by intuitively appealing anecdotal examples. Rigorous empirical tests, however, have failed to support the strict sales-maximisation hypothesis, particularly in terms of the long-run objectives of the firm. However, a number of reasons as to why firms might give greater consideration to sales revenues are identified including that the



firm's management may feel that lack of growth in sales will impair the company's reputation and dealings with its customers, distributors, financial institutions and employees, and that it will reduce the company's influence in the marketplace and make it more vulnerable to competitors.

The proponents of sales-maximisation recognise that some minimum level of profit is necessary, but they hold that the sales-maximising firm is willing to sacrifice some or all profit above this minimum in order to increase sales. Casual observations often have been made of this type of behaviour. Japanese firms, in particular, have drawn considerable attention to their efforts to increase their share of the world market by allegedly 'dumping', that is, selling their product abroad at prices lower than those charged in their own country, a tactic that is objectionable to the World Trade Organization.

However, the nature of the evidence suggests that such firms may be sacrificing some short-run profits in order to maximise profits in the long run. Sales-maximisation is part of their strategy to secure an advantageous competitive position that will produce more profit in the long run.

The agency model

The agency model is concerned with the contractual relationship between the *principals* (stockholders) and their *agents* (the managers). We have stated that the objective of the firm is to maximise its net worth in (expected) present-value terms. By *the firm* we really mean the owners or shareholders of the firm, whose interests presumably lie in the maximisation of their personal net worth. However, in modern corporations that are owned jointly by thousands of stockholders, the owners of the firm are typically excluded from the day-to-day process of making decisions, having delegated the authority to trained managers whose job is to make these decisions. In order for managers to function, the stockholders, acting through their board of directors, must delegate decision-making authority to a chief executive officer (CEO).

There are a number of things that executives might do in pursuit of their own interest rather than maximisation of the owners' wealth. For example, managers might enact highly visible policies that make themselves look good and thus insure promotions. Managers might be more interested in expensive perquisites (perks), such as beautifully decorated offices, luxury cars, and memberships in exclusive country clubs, than in reducing costs.

The problem is that the stockholders have no way of knowing whether or not they are doing their best to maximise the owners' wealth. Only in the case of owner-managed firms can we expect the objectives of the owners and the managers to coincide perfectly.

This difficulty has been called the *principal-agent problem*. The manager is an agent of the shareholders (the principals), making decisions on their

behalf. It is theoretically possible for stockholders to evaluate the managers' efforts by establishing an elaborate and costly intelligence system to monitor the managers' actions. In reality, of course, the stockholders' interests lie in avoiding such costs. Some agency theorists hold that monitoring management action is unnecessary. They point to empirical data that show a strong relationship between a company's profitability and executive compensation and offer these data as proof that market dynamics are sufficient to lead managers to give their best effort.

Other theorists argue that some costs to the stockholders are inevitable and are best incurred in the form of incentives for managers to give their best efforts for maximisation of the owners' wealth. This usually takes the form of an employment contract that provides for an annual bonus directly related to the firm's profits. The bonus may be related to the current year's profits or to the firm's performance over several years in the immediate past.

Such incentive contracts, however, do not guarantee the manager's unflinching pursuit of shareholder objectives, because the problem of asymmetric information remains.

Marginal analysis

Under conditions of certainty, the decision maker has complete knowledge of the various states of nature that are relevant to the decision and knows which one will occur. The decision maker simply chooses the strategy, course of action, or project that yields the greatest payoff.

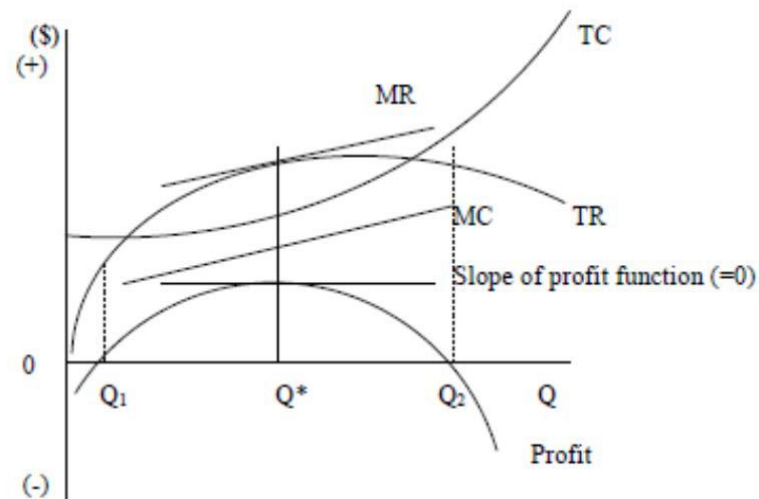
In general, decision-making under certainty requires that we find the largest payoff either by maximising benefits (such as revenue, profit, or utility) or by minimising costs. We can refer to these activities as optimisation analysis. For this purpose, we will focus on marginal analysis, one of a few optimisation techniques available to the decision maker.

Here, the objective is to find the level of output and sales that will maximise profit. Marginal analysis is a tool that can be used to find this optimal relationship. It utilises the concepts of marginal revenue and marginal cost as illustrated by Figure 1-1. The figure shows typical revenue, cost and profit curves of microeconomic theory.

Marginal revenue (MR) is defined as the additional revenue (change in total revenue) gained from the sale of one more unit of the product. It is graphed as the slope of the total revenue (TR) curve. Marginal cost (MC) is defined as the additional cost (change in total cost) of producing one more unit of output. It is graphed as the slope of the total cost (TC) curve.



Figure 1-1



At output levels Q_1 and Q_2 TR is equal to TC , and therefore profit is zero. For $Q < Q_1$ or $Q > Q_2$ the firm faces a loss (negative profit). When output is between Q_1 and Q_2 , profit is positive. Marginal analysis shows that profit is maximised at Q^* , where $MR = MC$. This is shown as the largest gap between the TR and TC curves, which coincides with the peak of the profit function. Note that at Q^* , the line tangent to the TR curve (MR) is parallel to the line that is tangent to the TC curve (MC). Therefore at the point of profit-maximisation, $MR = MC$.

Demonstration problem

Assume that a family-operated frozen yogurt outlet that sells its product in a competitive market is facing the following price and cost information

Market Price = \$2 (per frozen yogurt)

$$TC = 100 - 2Q + 0.02Q^2, \quad Q = \text{daily units}$$

What is this firm's maximising quantity and what is its maximum profit?

Answer:

$$\text{Total Revenue function} = TR = P \times Q = 2Q \quad MR = 2$$

$$\text{Total cost} = TC = 100 - 2Q + 0.02Q^2 \quad MC = -2 + 0.04Q$$

At the point of optimality:

$$MR = MC$$

$$2 = -2 + 0.04Q$$

$$Q = 100 \text{ frozen yogurt per day}$$

$$\begin{aligned} \pi &= TR - TC = \$2(100) - [100 - 2(100) + 0.02(100)^2] \\ &= \$100 \text{ per day.} \end{aligned}$$

Module summary



Summary

This course takes a prescriptive approach to managerial decisions; that is, it focuses on how managers can use economic analysis to arrive at optimal decisions. The aim of the prescriptive approach is to aid in solving important and difficult real-world decisions. One often hears the complaint, “That’s fine in theory, but it wouldn’t work in practice”. There is some validity to this objection; yet, in our view, the criticism misses the main point. To be useful, decision-making principles must be applicable to actual practice. In fact, most of the analytical methods we discuss were developed in response to important, recurring managerial decision problems. Of course, one can expect that different decisions will call for varying degrees of analysis in each step. The degree to which a decision is analysed (or the amount of information to be gathered) is itself a choice the manager must make. The key is to use the analytical approach flexibly.

In the course of our discussion, we make frequent reference to the actual practice of managerial decision-making – the customary methods by which business and government decisions are made. We need hardly point out that managerial practices frequently differ from our prescriptions. After all, if managers (and future managers like yourself) were always able to analyse perfectly the complex choices they face, there would be little need for courses like this one. Actual managerial practice changes slowly. Many methods and practices accepted as essential by today’s managers were unknown or untried by managers of earlier generations. These include many of the core decision methods of this course: information and uncertainty, the attribute approach to consumer behaviour, cost minimisation, and optimal pricing and market segmentation. The challenge of the prescriptive approach is to improve current and future practices.



Assignment



Assignment

1. What is the relationship between the field of managerial economics and (n) microeconomics and macroeconomics?
2. How does the theory of the firm differ from short-term profit-maximisation? Why is the former superior to the latter?
3. Find the present value of \$1,000 due in one year if the discount rate is 5 per cent, 10 per cent, 15 per cent, and 20 per cent. Find the present value of \$1,000 due in two years if the discount rate is 5 per cent, 10 per cent, 15 per cent, and 20 per cent.
4. The owner of a firm expects to make a profit of \$10,000 for each of the next five years and to be able to sell the firm at the end of the fifth year for \$50,000. The owner of the firm believes that the appropriate discount rate for the firm is 15 per cent. Calculate the value of the firm.

Assessment



Assessment

1. Suppose that the total revenue and total cost from an activity are, respectively, given by the following equations: $TR = 200 + 30Q - 5Q^2$ and $TC = 100 + 10Q$.
 - a. Write out the equation for the marginal revenue and marginal cost.
 - b. What is the equation for the marginal profit?
 - c. What level of Q maximises profits?
 - d. At that level of Q , what is the level of profit?
2. A manager makes the statement that output should be expanded so long as marginal revenue exceeds marginal cost. Does this strategy make sense? Explain.



Assessment Answers

1. Answers are as follows:
 - a. $MR = 30 - 10Q$, $MC = 10$.
 - b. Marginal profit = $(30 - 10Q) - 10 = 20 - 10Q$
 - c. Marginal profit = 0, $20 - 10Q = 0$, $Q = 2$
 - d. Profit = $TR (= 200 + 30Q - 5Q^2) - TC (= 100 + 10Q) = 240 - 120 = 120$

2. As long as MR exceeds MC, the marginal profit is positive, and hence, it pays to produce more output to capitalise on the opportunity.

References



References

- Baumol, W. J. (1961). What Can Economic Theory Contribute to Managerial Economics? *American Economic Review*, May.
- Baumol, W. J. (1967). *Business Behavior, Value and Growth*, Rev. Ed. New York: Harcourt Brace Johanovich.
- Baye, M. (2002). *Managerial Economics and Business Strategy*, Irwin: McGraw Hill.
- Wong, R. E. (1975). Profit Maximization and Alternative Theories: A Dynamic Reconciliation. *American Economic Review*, September.