

# **HEALTH CARE ECONOMICS**

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## Subject: HEALTH CARE ECONOMICS

## **SYLLABUS**

## Nature of Economic Analysis

What is Economics, What is Macroeconomics? What is Microeconomics? Value, worth and utility, Supply and Demand, Capital, Types of Economic Evaluation, Types of Economic Analysis.

#### **Functioning of Economic Systems**

Economic systems, functions and types of economic systems, Functions of an economic system, Types of economic system, Types of Economic Systems, Why It Matters Today.

#### **Economic Activity**

Economic activity, Nature of economic activities, Characteristics of economic activities, Non-Economic Activities, Reasons for which Business is regarded as an economic activity in our countryBusiness is regarded as an economic activity due to the following reasons.

Basic Economic Concept

Econimics Concepts

#### **Utility Analysis**

Utility, Utility and Satisfaction, The Law of Demand, Total Utility, Marginal Utility

#### **Nature of Demand And Determinants**

What is demand in Economics, Demand, Determinants of Demand, Main Determinants of Price Elasticity of Demand.

## **Elasticity of Demand**

Price elasticity of demand.

## Cost concept and Cost analysis

Cost Concepts, Main Types of Cost Analysis.

#### Unique nature of health

Nature of health, World Health Organization's (WHO's) definition of "health", The Lancet questions WHO's definition of health, Two aspects to health, Determinants of health, What is wellness? Self care, Occupational safety and health.

#### Health as a consumer and investment goods

Health as a consumer goods, Defining Consumer Health, Lifestyle choices of consumer health, Health Investment.

#### Valuation in health

Defining Fair Market Value, Using the Wrong Assumptions in a Fair Market Value Appraisal, Relying on the Market Approach to Value, Cost–utility analysis, What Prescription Is Required To Value A Medical Practice? Components of Medical Practice Value, Three Traditional Approaches To Determining Value, The Valuation Process, Newer Approaches To Determining Value.

## **Externalities in Health Care**

Externalities, Background info on Health economics, Negative Externalities and Health Care, Health care - positive externalities, Externalities of Medical Supply and Demand.

## **Market Analysis**

Market Configuration, Market segmentation, Dimensions of market analysis, Elements, The Need for Market Segmentation, Requirements of Market Segments, Bases for Segmentation in Industrial Markets.

## **Price Determination Under Different Market Conditions**

Pricing Strategy, Marketing Strategy and the Marketing Mix, Estimate the Demand Curve, Calculate Costs, Pricing Objectives

## **Suggested Reading:**

- 1. Using Discrete Choice Experiments to Value Health and Health Care (The Economics of Non-Market Goods and Resources... by Mandy Ryan, Karen Gerard and Mabel Amaya-Amaya
- 2. Emerging Health Technology: Relocation of Innovative Visual Knowledge and Expertise (SpringerBriefs in Health... by Kristian Wasen
- 3. Theory and Methods of Economic Evaluation of Health Care (Developments in Health Economics and Public Policy) by Magnus Johannesson
- 4. Health Care Economics (Wiley series in health services) by Paul J. Feldstein
- 5. Health Care Economics by Mohammad Mohsin Khan, Zareena Kosar and Zara Waqar

## Introduction of Economics

## Lesson 1 – Nature of economic analysis

## Learning Objectives

- To define the economics.
- To explain the Macro and Microeconomics.
- To explain the Supply and Demand.
- To describe the cost.

## 1.1 What is Economics

Economics is the study of the production, distribution, and consumption of goods and services — the economy. Economists attempt to understand the economy and the way it responds to various influences, such as changes in federal interest rates. Economics is considered a social science.

Modern economics began in 1776, with the publication of Adam Smith's *Wealth of Nations*. This was the first comprehensive defense of the free market, and continues to be an influential work to this day. Central to the work was the concept of the "invisible hand", the idea that the market, while appearing chaotic, is actually guided to produce the right amount and variety of goods and services. If there are insufficient goods, there will be great economic incentives to produce more; if there are surplus goods, there will be an economic incentive to produce less or different types of goods. Smith's work was so influential that previous tentative schools of economics were abandoned after its publication.

Economics is a field that can be broken down into a variety of different schools, divisions, and methods of analysis, although the primary two methods are macroeconomics — the study of economies in aggregate — and microeconomics — the study and modeling of individual agents in an economy. Economists have worked out theories of markets which approximate real-world trends and behaviors.

Most economists advocate a laissez-faire economy, meaning an economy with minimal government intervention. They point to the collapse of the Soviet Union as an example of a failed economy with too much central control, and the success of the United States as a model of a laissez-faire economy. Unfortunately for economists, polls of laypeople frequently shows they approve of limited government interventions in the economy.

Another basic tenet of economic theory is that, through self-interest among large numbers of agents, broader social interests may be served in the long run. When people focus on being as productive and possible and providing goods and services in sufficient demand, they do benefit, but so do others who utilize those services, and the public sector, which takes money off the top through taxes.

## 1.2What is Macroeconomics?

The field of economics known as macroeconomics focuses on the behaviors of a national economy, or a regional economy, as a whole. Macroeconomics is a very general field that concerns itself primarily with large scale indicators, such as unemployment rates, and with the creation of models meant to explain relationships between those indicators. It is also considered the complement to microeconomics, which studies the actions of individuals rather than larger scales.

Macroeconomics became a viable area of economic study in the 1930s due directly to the Great Depression. Until that time, economists did not consider individual activities from the behavior of a national economy as a whole. John Maynard Keynes, a British economist, and other economists who worked to explain the causes of the Great Depression, were especially influential in the development of macroeconomics.

Keynes' theories dominated the field until fairly recently. Keynesians relied on aggregate demand to answer questions central to macroeconomics, such as how to explain levels of unemployment. In the late 1980s, Keynesian economists reconciled with classical economists, a significant struggle in which economists worked to reconcile microeconomic models to those developed in macroeconomics. While Keynesian models are no longer the basis of the field, current models are heavily influenced by their Keynesian predecessors. So far, no economic school of thought has developed a model that completely and accurately reproduces the workings of an economy, leading to disparate conclusions. However, considering theories from each can allow an economist to develop a working approach to the field.

The study of macroeconomics has led to the use of governmental policies to effect economic change, with the hope of avoiding depressions and other economic shocks. The two key tools used to manage national economies are fiscal and monetary policies. Policies developed from this field of economics have wide effects — as a rule, they are the politics that make the evening news.

## 1.3 What is Microeconomics?

Microeconomics is a field of economic study that focuses on how an individual's behavior and decisions affect the supply and demand for goods and services. For the purpose of microeconomics, the actions of individuals, households and businesses are crucial, unlike the study of macroeconomics, which focuses on national and international economic trends. Despite the differences between the two fields, however, micro-level trends and the study of microeconomics are considered the basis of modern macroeconomics.

Microeconomics includes a number of specialized areas of study. Key applied microeconomics fields are price theory and labor economics. While each of these subfields relies on various theories and tools, all of them fall back to the theory of supply and demand. Theoretically, all markets are perfectly competitive, with supply and demand driving prices. However, in practice, individuals and groups can directly affect the supply and demand of products and services.

Surprisingly simple questions fall into the field of microeconomics. For instance, an employee might receive a raise. Does that raise cause the employee to increase or decrease their work hours? Not all employees will make the same decision, making this question a focus for microeconomics study, which assumes all decisions must be rational.

Another key area of microeconomics is the study of market failure. Market failure is not the assumption that a market has ceased functioning; instead, it is a situation in which a market is inefficient, whether in organizing production or allocating goods and services, usually to an extreme point. These market failures can occur because of monopolies, a lack of information for either buyers or sellers and other issues.

Opportunity cost is also a main concern in microeconomics. While difficult to measure in macroeconomics, opportunity cost can be clearly demonstrated in microeconomics: an individual can point to specific opportunities that become unavailable as they use their resources for other purposes. For instance, an employee may need to decide to take a class that improves her chances for promotion over taking a vacation.

## 1.4 Value, worth and utility

## 1.4.1 What is Value?

A generally accepted notion of value is available in Wikipedia: Value is the worth of goods and services as determined by markets. Thus an important part of Economics is the study of policies and activities for the generation and transfer of Value within markets in the form of goods and services. Often a measure for the worth of goods and services is units of currency such as the US Dollar. But, unlike the units of measurements in Physics such as Seconds for Time, there exists no absolute basis for standardizing the units for Value. Usually the value of a currency is related to the value of Gold, which in turn is valued by amount or number of goods and services that it can be exchanged for. Because the rate of production of gold in the world is slower than the rate of creation of goods and services, the relation between gold and currencies is not as strict as it used to be.

Thus, one of the most complicated and most often misunderstood parts of economy is the concept of *value*. One of the big problems is the large number of different types of values that seem to exist, such as *exchange-value*, *surplus-value*, *use-value* 

## 1.4.2The buyers utility

The discussion of values all start with one simple question: What is something worth?

Today's most common answer is one of those answers that are so deceptively simple that it seems obvious when you know it. But then remember that it took economists more than a hundred years to figure it out: *Something is worth whatever you think it is worth.* "Something is only worth what someone is willing to pay for it" Quote Jonathan Reeves

This statement needs some explanation. Take as an example two companies that are thinking of buying a new copying machine. One company does not think they will use a copying machine that much, but the other knows it will copy a lot of papers. This second company will be prepared to pay more for a copying machine than the first one. They find different *utility* in the object.

The companies also have a choice of models. The first company knows that many of the papers will need to be copied on both sides. The second company knows that very few of the papers it copies will need double sided copying. Of course, the second company will not pay much more for this, while the first company will. In this example, we see that a buyer will be prepared to pay more for the increase in utility compared to alternative products.

So we can summarize this with the statement that **the economic value of an item is set by the increase in the customers utility**. This increase in utility is called *marginal utility*, and this is all known as the *Marginal theory of value*.

## 1.4.3 The sellers utility

But how does the seller value things? Well, in pretty much the same way. Of course, most sellers today do not intend to use the object he sells himself. The utility for the seller is not as an object of usage, but as a source of income. And here again it is marginal utility that comes in. For which price can you sell the object? If you put in some more work, can you get a higher price?

Here we also get into the resellers utility. Somebody who deals in trading will look at an object, and the utility for him is to be able to sell it again. How much work will it take, and what margins are possible?

## 1.4.4 Subjective value

So not only do the two different buyers have a different value on an object, the salesman puts his value on it, and the original manufacturer may have put yet another value on it. The value depends on the person who does the valuation, it is subjective.

So, how do all these subjective values turn into the price? To understand that, we must take a look at the place where things are bought and sold: The market.

## 1.4.5 The Market

The market is the place where buyers and sellers go to buy and sell. The name comes of course from those gatherings of people in towns, but today markets don't need to be physical. Not only can you have electronic marketplaces such as eBay, markets are also seen as the congregation of all people buying and selling things everywhere. This is usually named *"the market"* and referenced to as it is a thing with a will and a power of it's own. But of course, it is just the average will and opinion of all the buyers and sellers, the *actors*, on the market that shows itself by prices rising and falling and money moving around.

## 1.4.6 Setting a price

An object's value is not something fixed, but instead a subjective property of the object. This subjectivity may be a bit surprising, it is easy to imagine that something must have an objective worth being bought and sold. However this is not the case, in fact, it's the opposite.

When somebody has an item to sell, he puts a value on this item, and will not sell under that value. Likewise, when somebody wants to buy something, he will put a value on the object, and will not pay more than this. If these valuations overlap, so that the buyer's valuation is higher than the seller's valuation, the object will be sold. If the seller's valuation is higher than the buyer's, the buyer will simply say "it's not worth it" or the seller will say "it's worth more than that" and no deal will be made.

Of course, you don't haggle about price every time you buy a candy bar, but you still agree on a price. It's just that the store owner has put up a sign with a price, and you can either accept it or reject it. Neither you nor him want to haggle about something that just costs eighty cents, because it's simply not worth the effort. So even though haggling is not a necessary part of the pricing, both the buyer and seller agrees on the price, and both think they are better off after the exchange. Think about this: If you would think you would be worse off after buying something, would you buy it? Of course not, so buying and selling is an act done by free will. (Unless of course somebody is pointing a gun at you, but then it's not buying and selling, but stealing.)

Now, we know that the price ends up somewhere between the seller's valuation of the item and the buyer's valuation of the item. The question of what the price of an item will be, therefore depends on these valuations. What, then will these valuations depend on?

So as you see, if an object had an intrinsic, objective worth, and both seller and buyer were aware of it, the buyer's and seller's valuation of the object would never overlap, and no deal would ever be cut, because the seller would never be willing to sell it at a price less than the objective worth [or else he would be in loss] and the buyer would never be willing to buy it at a cost higher than the objective worth [why would he?], and hence, nobody would ever sell or buy anything. The subjectiveness of value is necessary for things to be sold and bought at all.

## **1.4.7 Free and Regulated markets**

The description above is of a free market, where anyone can buy and sell, and where price is set by buyer and seller alone. This is not always the case. Instead many markets are *regulated*, to limit either the people involved or the prices or both. For example, not everyone is allowed to sell medicine, claim to be a doctor or drive a taxi. The government has to approve you in one way or another to make sure you know your job and are not a danger to others. In the same way, not everybody is allowed to buy firearms. You need a clean criminal record and, in most countries, you need to show you know how to use a firearm safely.

In some cases the prices are regulated by the government. In some European countries rents are controlled by the government to prevent what is perceived as overcharging.

Of course, it can be said today that all markets are regulated in some way. You are, for example, not allowed to use violence, break agreements or steal. But the state setting up the rules for making the market function smoothly is not usually seen as making the market non-free.

## 1.4.8 Money

Money is such an obvious and integral part of today's society, that it is sometimes difficult to imagine society without it. It's also a very abstract concept, and can be hard to grasp. It comes in many forms, from special types of sea-shells, to pigs, and via the paper and coin system to digital blips in a computer. But what is money, really?

As we have seen, people value things differently. But communicating this value to somebody else is a problem. The only way you can communicate this value is by comparing it with other things. But since all others, just like you, have subjective values, it becomes complex and confusing. This gets evident if we look at how value impacts on barter

## **1.4.9** The complexities of barter

When exchanging goods by barter, you need to find something you want more than something you have, while the person you barter with has to value the thing you have more than the thing you want. There are four individual valuations that must match.

An example might clear things up: If what you really want is some shoes, and the thing you have that you want to get rid of is a chair, you have to find a shoemaker that needs a chair, or you will not get any

shoes. Say that the shoemaker instead needs a lamp. Then you can find somebody else that needs a chair, and has a lamp, barter that, and then go to the shoemaker.

Now, the big problem here is that when you are to value the lamp, it is no longer what you think of the lamp that is important. It's what the shoemaker thinks of the lamp. You need to guess it's average value, so that you can be reasonably sure that the shoemaker will want it. The effect of this is that you pretty much need to know how people value almost everything, since you'll be forced into bartering almost everything.

It's obvious to us today that this is not very efficient. We don't do it like that. What happened? Well, two things. First the appearance of markets, in the physical sense. That is, agreed places and times where people go to sell and buy stuff. It makes it easier, because you can actually drag the shoemaker over to the lampmaker and cut a three-way deal then and there . But the second and much greater invention is the use of a common value system; money.

## 1.4.10 The essence of money

And that, in essence, is what money is, a common value system. It is a way for you to simply quantify the value into a number and communicate this to others. Instead of having to weigh the values of the shoes against the lamp against the chair, you can set a number on it. You can say that your chair is worth five units, the lamp maker can value his lamp to three units and the shoemaker thinks his shoes are worth four units. We can now instantly and easily compare values. Trading suddenly got much easier.

But that's not all. With a common value system that is based on exchangeable entities, we can exchange these entities as payment. You can now go down with your chair to the market, sell the chair to the highest bidder, and then go with your money to the shoemaker, and buy a couple of shoes. The shoemaker in turn takes the money and goes to the lamp maker. No longer do you need to evaluate the average market value of the lamp, or cut three-way deals. All you need to do is find somebody that is willing to pay what you think your chair is worth, and find a pair of shoes that is cheap enough for you.

And it doesn't even end there! Money is storable. If you have a source of income that is seasonal you can keep the money you make during high-season and buy food for it during low season.

So, this is all money is. A common value system based on exchangeable entities. But this simple concept makes life much less complicated in so many ways.

## 1.5 Supply and Demand

The principle of *supply and demand* is one of the best-known principles of economic theory. It was first posited by Jean-Baptiste Say, an 18th-century Classical Political Economist who suggested that demand and supply are interrelated. His theory was that the higher demand there is for something, the more people want it. The more that people want it (the more they value it), the more they are willing to pay for it. For example: There are 100 dolls and 400 people that want those dolls. Since there are more people that want dolls than there are dolls, people will pay more money for them.

Alfred Marshall, a famous neoclassical economist, went further in the mid-20th century and developed a mathematical model of supply and demand. The two variables in this theory are price and quantity.

## 1.6 Capital

Capitalism, as its name suggests, is based on the ownership of Capital. What is capital? Basically, capital is anything that can be traded for something else. Any amount of money is capital, as it can be traded for a huge variety of things. Personal items are also capital because they can be sold; houses, cars, and other bizarre items fall under this category. The ability to work can also be considered capital, or labour-power.

Karl Marx first posited that perhaps there was something that separated capital into two broad categories. Some capital is bought, and then the value is fixed; this applies for an item of clothing or food, for instance. Some may lose value and depreciate; cars fall into this category. Some capital, however, can actually produce more capital which can then be sold; this, he argued, is *real* capital. For example, if you have a cookie-stamper and a van, some flour, butter, and other cookie ingredients, with that capital, you could produce cookies and ship them around in the van selling them for a profit, albeit small.

## 1.7 Types of Economic Evaluation

The basic objectives of an economic analysis are to **identify, measure, and value the comparative costs and effects of alternative health care interventions.** The alternatives could include different medical technologies for a particular indication, such as medication vs. surgery for peptic ulcer. Alternatives also could include preventive vs. curative techniques, different types of diagnostic workups, or choices of setting for delivery of care.

The four common types of economic evaluation are cost-minimization analysis, cost-effectiveness analysis, cost-utility analysis, and cost-benefit analysis. These analyses address questions of economic efficiency--the extent to which limited resources are used to produce the maximum possible benefits. Full economic evaluation must (1) consider at least two alternative health care interventions; and (2) consider simultaneously both the costs and the effects of the interventions.

From any perspective of analysis, **resources and their costs are measured and valued in the same way** across the four types of economic analysis. In contrast, **the effects obtained with the given alternatives are measured and valued quite differently** with each form of analysis.

## 1.7.1 Cost-minimization Analysis

When relevant effects of the given health care interventions are observed to be similar, **cost-minimization** analysis is used to compare net costs. In principle, this analysis requires clinical evidence to support the notion that differences in health effects between alternatives are minimal or not important.

## 1.7.2 Calculating Cost-effectiveness

Cost-effectiveness analysis measures the cost-effectiveness ratio (i.e. the net cost per unit of health outcome achieved) for each intervention under study. The calculation is represented by:

## Formula For Cost-Effectiveness

C/E

where:

- C = new cost
- E = unit of health effect achieved

Cost-effectiveness analysis assesses a single outcome of interest that is common to the given alternative interventions but that differs in magnitude between these alternatives.

Suppose, for example, that an economic evaluation is comparing costs and effectiveness of hospital dialysis vs. kidney transplantation in the prolongation of life after kidney failure. Life-years gained--the outcome of interest--is common to both interventions. The two alternatives, however, may achieve this common effect to different degrees. Results in this case would be expressed as cost per life-year gained.

#### 1.7.3 Example of Cost-effectiveness

Below is an example that illustrates cost-effectiveness analysis from a published study.

The economic evaluation used computer simulation to estimate the cost-effectiveness ratios for various antihypertensive medications from 1990 through 2010. The table below includes the projected net costs and years of life saved for each antihypertensive treatment.

Table 2: Projected Cost-Effectiveness of Antihypertensive Medications					
	Propranololhydro- chloride	Captopril	Hydrochloro- thiazide	Nifedipine	Prazosin hydrochloride
\$ costs of antihypertensive therapy (in billions)	85.80	235.80	64.20	165.00	280.00
\$ coronary artery disease treatment savings (in billions)	-39.70	-26.40	-19.30	-39.60	-43.20
\$ net costs (in billions)	46.10	209.40	44.90	125.40	236.80
Years of life saved (in millions)	4.21	2.90	2.74	3.96	3.82

Note: costs and years of life were discounted by 5% per year.

Using the formula C / E, where C equals net cost and E equals unit of health effect achieved, the projected cost-effectiveness ratio for the first agent, propranolol hydrochloride, would be about \$10,950 per life-year saved. The estimated net cost of propranolol hydrochloride would be \$46.1 billion, and the estimated years of life saved as a result of treatment with propranolol hydrochloride would be 4.21 million. Thus, \$46.1 billion / 4.21 million life years saved = \$10,950 per life-year saved.

## **1.8 Types of Economic Analysis**

Policymakers have a variety of economic analyses at their disposal to help them assess policies and programs. *Cost analysis, fiscal impact analysis, cost-effectiveness analysis,* and *cost-benefit analysis* are among the most commonly used tools. This document describes these four types of economic analysis, compares and contrasts them, and explains which circumstances warrant their use.

## 1.8.1 Cost analysis

Cost analysis provides a complete accounting of the expenses related to a given policy or program decision. It supplies the most basic cost information that both decision makers and practitioners require and forms the foundation of all other economic analyses.

A cost analysis sounds simple, but it requires effort to perform a cost analysis thoroughly. Analysts frequently identify only the most obvious costs, such as staff salaries, and fail to account for many others. A complete cost analysis needs to consider:

- *Direct costs*, like equipment and fringe benefits, in addition to staff salaries;
- Indirect costs or overhead, such as central support services;
- For new programs or policies, *start-up expenditures* and *one-time costs*, including hiring and training;
- *Future costs*, including wage increases, contributions for increasing pension and insurance expenses, and other escalating costs; and
- *Capital costs*, including debt service.

## **1.8.2 Fiscal impact analysis**

A fiscal impact analysis is a comprehensive study of all governmental revenues, expenditures, and savings that will result from the proposed policy or program. State and local fiscal offices routinely produce fiscal impact analyses, which are also called *fiscal notes* when they are prepared for draft legislation. This type of analysis helps policymakers determine whether a proposed initiative is affordable from a budgetary standpoint.

## 1.8.3 Cost-effectiveness analysis

A fiscal impact analysis can help you assess how a program or policy will affect your budget but it won't tell you whether the program or policy is an efficient use of resources. There may be less expensive options that produce equivalent results. To evaluate which program or policy creates the result you want at the lowest cost, use cost-effectiveness analysis (CEA).

Suppose that you're comparing two job-training programs, both of which serve 1,000 ex-offenders per year. After doing a comprehensive cost analysis, you find that Program A costs \$10 million and Program B \$7.5 million annually. Program A, which costs \$10,000 per client, is more expensive than Program B, which costs \$7,500 per client. Program A, however, places more of its clients in permanent employment than Program B. The appropriate measure of the programs' cost-effectiveness is the total program cost divided by the desired outcome, in this case, the total number of job placements. The results show that Program A is more cost-effective, i.e., a better use of resources, because its cost per placement (\$13,333) is lower than Program B's (\$15,000).

Indicator	Total Cost	Clients	Cost per Client	Placement Rate	Placements	Cost per Placement
Program	\$		\$			\$
Α	10,000,000	1,000	10,000	75%	750	13,333
Program	\$		\$			\$
В	7,500,000	1,000	7,500	50%	500	15,000

Note that CEA is a valuable tool for weighing programs or policies with similar outcomes, but it should not be used to compare programs that have different outcomes.

## **1.8.4** Cost-benefit analysis

Cost-benefit analysis (CBA) is a method for comparing the economic pros and cons of policies and programs to help policymakers identify the best or most valuable options to pursue. A characteristic feature of CBA is that it *monetizes*, or puts into dollar terms, all the benefits and all the costs associated with an initiative so that they can be directly compared. Policies and programs whose benefits outweigh their costs generate *net benefits*.

In contrast to CEA, CBA allows you to compare initiatives that have different purposes—such as a reduction in victimization or an improvement in program participants' reading scores—because the outcomes have been monetized. In contrast to fiscal impact analysis, CBA evaluates the costs and benefits of programs and policies from multiple perspectives, not just that of government agencies. For example, when evaluating a criminal justice program using CBA, the costs and benefits to victims, offenders, program participants, family members, and communities need to be factored in.

Costs and benefits are measured over a long-term horizon, and future dollars are discounted to reflect the *time value of money*, that is, the concept that money is worth more to us in the present than at some point in the future. The result of a cost-benefit analysis is typically presented as a benefit-cost ratio that indicates the benefit received for every dollar invested, providing a bottom-line summary of the net benefit to society.

## 1.8.5 Keep in mind

Of the four types of economic analysis described above, CBA is the most comprehensive. However, it is not always necessary or advisable to conduct a cost-benefit analysis of an intervention, as CBAs can be difficult and time-consuming to perform. The other tools may be more feasible to use or may provide sufficient information. Below is the simple comparison of the kind of information each type of economic analysis can provide.

#### Figure

Type of economic	Information provided
analysis	

Cost analysis	How much something costs
Fiscal-impact analysis	How your budget will be affected
Cost-effectiveness analysis	How many outputs you get for your dollar
Cost-benefit analysis	How much benefits outweigh costs

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## 1.8.6 Know your costs

- Direct costs
  - Staff salary plus fringe benefits (e.g., health insurance, employer's share of social security, workers compensation, unemployment insurance, pension contribution, vacation wages)
  - Equipment, such as computers and office supplies
  - Rent, occupancy, office maintenance, and other space-related costs
  - Training
- Indirect costs
  - Executive staff
  - Central support (e.g., human resources, fiscal, information technology)
- Start-up and one-time costs (e.g., furniture, equipment, consultants)
- Future costs
  - Wage increases, including anticipated collective-bargaining settlements
  - Additional pension contributions
  - Anticipated health-insurance escalation
- Capital expenses
  - Project planning, design, development, and professional services
  - Real estate, materials, and construction
  - $\circ$  Contingency
  - Debt service

**Review Questions** 

- 1. Define the economics?
- 2. Explain the Macro and Microeconomics?
- 3. Explain the Supply and Demand?
- 4. Explain the Value, worth and utility?

**Discussion Questions** 

Discuss the cost and its analysis?

## Lesson 2 – Functioning of economic systems

Learning Objectives

- To define the economic systems.
- To explain the traditional and non-traditional functions of economics.
- To explain the types of economic system.
- To describe the Economic functions in a mixed economy.

## 2.1 Economic systems, functions and types of economic systems

Due to the problem of scarcity, every economic system be it capitalist, socialist or any other economic system, needs to function to satisfy societal needs. Given such scarce resources, it believed that choices must be made as to what to produce, how much of each commodity to produce, how to produce it and for whom. Every society sets up some means for answering its fundamental economic questions. This entity is called the economic system.

Economic system refers to the means by which decisions involving economic variables are made in a society. In this light, a society's economic system determines how the society answers its fundamental economic questions of what to be produce, how the output is to be produced, who is to get this output and how future growth will be facilitated, if at all.

The essential differences of economic systems lie in the extent to which economic decisions are made by individual as opposed to governmental bodies and in whether the means of production are privately or publicly owned.

#### 2.2 Functions of an economic system

Economic systems everywhere may perform similar functions. These functions may be traditional or non-traditional. The traditional functions include the following:

a. What to produce

b. How to produce i.e. what method of factor combination to adopt in order to maximize the use of the resources

- c. For whom to produce
- d. How to distribute the goods and services produced.

Economists have realized the importance of economic growth and the attainment of full employment, if the system must achieve the best use of its scarce resources. Attainments of full employment and high economic growth have become the non-traditional functions.

## 2.2.1 Traditional functions

The traditional functions of every economic system include the following:

**A.** In deciding on what goods to produce, an economic system also decides in what not to produce. For example, if the system wants to provide roads and recreational facilities, it may have problems since it may lack enough resources to do so at the same time. It will be necessary that it chooses between the two. It may for instance have to choose roads. An economic system can consider a wide variety of goods than the other which is poorly endowed.

**B.** Economic systems also function to decide on the particular technique to be used in production. Here, the economic system decides what method of factor combination to be employed in order to maximize the use of the scarce resources, by minimizing cost and increasing productivity. The decision may involve whether to employ labor-intensive or capital-intensive methods of production. In a free exchange economy, its choice will depend on relative factor endowment and factor prices. In developing countries for instance, labor is more abundant and cheap. A labor-intensive method may be preferred.

**C.** Another problem the economic system is faced with is for whom to produce. To get maximum use from the scarce resources, the commodity must be produced in an area where it would be demanded and where costs will be minimized. The production unit may be sited near the source of raw material or the market center depending on the nature of the product.

## 2.2.2 Non-traditional functions

**A.** Economic systems must ensure economic growth. Owing to scarcity of resources, the society must know whether its capacity to produce goods and services is expanding or decreasing. Some of the major ways to promote economic growth are ensuring adequate rate of growth of per capita income; improvement in technology through the adoption of superior techniques of production; better and more extensive education and training of the labor force and others.

**B.** Society must also ensure full employment. It is the task of economic systems to ensure that resources are not idle or unemployed, since resources are scarce. In the market economy, full employment is achieved by stimulating demand.

## 2.3 Types of economic system

There are different types of economic system. These include the traditional, the command/socialist economy, pure capitalism and mixed economic systems.

## 2.3.1 The Traditional Economy

This is the type of economy in which the organization of production and distribution is frequently governed by tribal rules or customs. This type existed mostly in the early stages of development where the economy is strongly linked to the social structure of the community and people perform economic tasks for non-economic reasons. In the traditional economy, economic matters are largely determined by social

or religious customs and traditions. For example women may plough fields because that is their customary role and not because they are good at doing so. Traditional economic systems are often found in less developed countries, where they may be a hindrance to economic progress.

## 2.3.2The Command Economy

In the command economy, an authoritarian central government calls the tune. It operates on instruction from those in power. In this type of economy, decisions in connection with the functions of an economic system are taken on collective or group basis. There is collective ownership of factors of production. The group that owns the factors of production and takes decisions may be some government body. A command economy is a centrally planned economy. There is typically very little freedom of choice. The occupation of workers, the quantities of which type of commodity to be produced and the distribution of income are determined by the central planners plus making arrangements for future economic growth. Cuba, North Korea, Russia and Iran are examples of economies that are closest to perfect command economies.

## 2.3.3Pure capitalism

It is an economic system based on private ownership and the freedom of individuals to conduct their economic affairs without interference from government bodies or other groups. Capitalist economic systems are characterized by a great deal of freedom of choice exercised by consumers and business firms in the market for commodities and resources.

The capitalist economy is also known as the free exchange economy or market economy. The essence of pure capitalism is freedom. There is freedom to own property, freedom to buy and sell and freedom from government interference in the economic aspect of each individual's life. Capitalism is best characterized by the economy of the United States, even though it is not a purely capitalist economy.

## 2.3.4 Mixed economy

Many economies are best described as mixtures of capitalistic and command systems. The United State and other countries where markets are heavily relied on to allocate resources and distribute output are known as mixed capitalistic systems. The characteristics of free enterprise system are manifested in most of its economic activities. However, some of its economic decisions of the mixed economy are taken on collective basis and some of the productive resources or goods are owned by a governmental body. In the mixed capitalistic economic system, both government and private decisions are important.

## 2.3.5 Economic functions of a modern government in a mixed economy

In a mixed economy, the governments besides public sector play an important role in the economic life of the state through the revenue and expenditure measures of its budget. The important functions are:

- (i) Allocation function
- (ii) Distribution function
- (iii) Stabilization function

## **Allocation Function:**

Government has to provide for public goods. Public goods such as national defense, government administration and so on are different from private goods. These goods can not be provided through market mechanism but are essential for consumers and therefore, government has to provide them. Because of that government has to allocate resources between private goods and public goods.

Private goods are limited to some individual or individuals but public goods are available to all. Secondly, private goods are available to those only who can buy them but this is not the case with regard to public goods. These are available to those also who can't afford them financially,

## **2.3.6 Distribution Function**

Through its tax and expenditure, policy government affects distribution of personal income of households in a manner, which is just and fair. As such it taxes the rich and spends for the schemes which benefit more the poor.

## 2.3.7 Stabilization Function

Economy of a country is affected by economic fluctuations such as conditions of boom and depression. Such changes benefit some and harm others. In such a situation appropriate policy measures are required by the government to affect the levels of aggregate demand. Such measures are called stabilization measures. These measures aim at avoiding the situations of inflation and unemployment.

## 2.4 Types of Economic Systems

"You can't always get what you want." That is what the Rolling Stones sang, anyway (check it out: great song even if it's a bit before your time). And while Mick Jagger probably didn't have Econ 101 in mind, he managed to sum up perfectly the core concept underlying all economics.

**Scarcity** is the fundamental challenge confronting all individuals and nations. We all face limitations... so we all have to make choices. We cannot always get what we want. How we deal with these limitations—that is, how we prioritize and allocate our limited income, time, and resources—is the basic economic challenge that has confronted individuals and nations throughout history.

But not every nation has addressed this challenge in the same way. Societies have developed different broad economic approaches to manage their resources. Economists generally recognize four basic types of economic systems—traditional, command, market, and mixed—but they don't completely agree on the question of which system best addresses the challenge of scarcity.

A **traditional economic system** is—here's a shocker—shaped by tradition. The work that people do, the goods and services they provide, how they use and exchange resources... all tend to follow long-established patterns. These economic systems are not very dynamic—things don't change very much. Standards of living are static; individuals don't enjoy much financial or occupational mobility. But economic behaviors and relationships are predictable. You know what you are supposed to do, who you trade with, and what to expect from others.

In many traditional economies, community interests take precedence over the individual. Individuals may be expected to combine their efforts and share equally in the proceeds of their labor. In other traditional economies, some sort of private property is respected, but it is restrained by a strong set of obligations that individuals owe to their community. Today you can find traditional economic systems at work among Australian aborigines and some isolated tribes in the Amazon. In the past, they could be found everywhere—in the feudal agrarian villages of medieval Europe, for example.

In a **command economic system** or **planned economy**, the government controls the economy. The state decides how to use and distribute resources. The government regulates prices and wages; it may even determine what sorts of work individuals do. **Socialism** is a type of command economic system. Historically, the government has assumed varying degrees of control over the economy in socialist countries. In some, only major industries have been subjected to government management; in others, the government has exercised far more extensive control over the economy.

The classic (failed) example of a command economy was the communist Soviet Union. The collapse of the communist bloc in the late 1980s led to the demise of many command economies around the world; Cuba continues to hold on to its planned economy even today.

In **market economies**, individuals make economic decisions. The unfettered interaction of individuals and companies in the marketplace determines how resources are allocated and goods are distributed. Individuals choose how to invest their personal resources—what training to pursue, what jobs to take, what goods or services to produce. In addition, individuals decide what to consume. Within a **pure market economy** the government is entirely absent from economic affairs.

The United States in the late nineteenth century, at the height of the lassez-faire era, was about as close as we've seen to a pure market economy in modern practice.

A **mixed economic system** combines elements of the market and command economy. Individuals make many economic decisions in the market. But the government also plays a role in the allocation and distribution of resources.

The United States today, like most advanced nations, is a mixed economy. The eternal question for mixed economies is just what the right mix between the public and private sectors of the economy should be.

## 2.5 Why It Matters Today

Half of the twentieth century went down as a global battle between defenders of free markets (democratic capitalist nations, led by the United States) and believers in command economies (the communist bloc, led by the Soviet Union).

The US and USSR never went to war against each other directly, but dozens of smaller (yet still tragic and significant) wars unfolded around the world as bitter fights over economic systems turned bloody. Korea, Vietnam, Nicaragua, Afghanistan, Angola... millions of people died in the various "hot" theaters of a Cold War fought to decide whether markets or states should control economic affairs.

The great irony was that the Cold War finally ended not on a battlefield, but because the Soviet economy finally self-destructed by the late 1980s. For most of the world, the Soviet collapse proved that command economies were simply inferior to the market-dominated mixed economies of the capitalist world. Of course, China – still ruled politically by an authoritarian Communist Party, even though its economy is now more mixed if not exactly free – is now the biggest creditor nation to the United States.

## **Review Questions**

- 1. Define the economic systems?
- 2. Explain the Upper and the Lower Respiratory Tract?
- 3. Explain the types of economic system?
- 4. Explain the Economic functions in a mixed economy?

## **Discussion Questions**

Discuss the economic systems in details?

Lesson 3 – Economic activity

#### Learning Objectives

- To define the economic activity.
- To explain the nature of economic activities.
- To explain the characteristics of economic activities.
- To describe the Business as economic activities.

## **3.1Economic activity**

Economic activities are also known as 'occupations'. Economic activities or occupations may be classified into three broad categories as follows:

## 3.1.1 Business

Business includes all those economic activities, which are concerned with production and exchange of goods or services with the object of earning profits.

Business is an economic activity because it is undertaken for earning money and producing wealth. All organizations, which carry on business, activities, are called business enterprises or 'business firms'. Similarly the persons who are engaged in business are known as 'businessmen'.

Business creates various types of utilities by making goods and services more valuable and useful to consumers. When raw materials are converted into finished products, it creates form utility.

Place utility is created by transporting goods from the place of production to the place of consumption. Goods are stored for future use which results in the creation of time utility.

A factory, a shop, a transport company, a warehouse, an insurance company, a bank are all examples of business activity. Firms providing direct services e.g., tailor, drycleaner, beauty parlor, etc., are also business enterprises.

## 3.1.2 Profession

The terms profession means an occupation, which involves application of specialized knowledge and skills to earn a living. The persons who are engaged in profession are called professionals.

They render personal services of a specialized nature to their clients. The service is based on professional education, training and experience. Professionals receive fee for their services. Chartered Accountancy, medicine, law, tax consultancy are examples of professions.

The main features of a profession are as follows:

## 3.1.2. 1 Specialized body of knowledge:

Every profession has a specialized and systematized body of knowledge. Members of the profession are required to learn this knowledge.

## 3.1.2. 2 Restricted entry

Entry to a profession is allowed only to those who have completed the prescribed education and have passed the specified examination.

## **3.1.2. 3 Formal Training**

A profession provides facilities for formal education and training to those who want to acquire professional qualification.

## 3.1.2. 4 Professional association:

Every profession has its own association. A professional association is a statutory body and its membership is essential. The association regulates entry in the profession, grants certificate of practice, formulates and enforces code of conduct.

## 3.1.2. 5 Service motive

Professionals are expected to emphasize services to their clients rather than economic gain.

## **3.1.2. 6 Code of conduct:**

The activities of a professional are regulated by a formal code of conduct. The professional association of which he is a member prescribes the code.

## 3.1.3 Employment

Employment means an economic activity, whereas people work for others in exchange for some remuneration. The persons who work for others are called 'employees'. The persons or organizations which engage others to work for them are called 'employers'.

The remuneration by an employer to his employee is known as wages or salary. The employee performs the work assigned to him by his employer as per the terms and conditions of employment.

There is an oral or written agreement between the employer and the employee the employee acts under the guidance and control of his employer.

The employer may be a Government (department) undertaking or a private firm. Employment thus includes all types of jobs in government offices and private enterprises.

When a professionally qualified person works as an employee, he is also said to be in employment. For example, a doctor may be employed in a hospital, a chartered accountant may be working as an accountant in a company and a lawyer may serve as a law officer in a bank.

Various examples of employment are as follows:

- (i) A teacher teaching in a school or college.
- (ii) An engineer employed in Municipal Corporation of Delhi.
- (iii) An accountant working in the accounts department of a company.
- (iv) A person working as the plant manager of a factory.

(v) A nurse or doctor working in a hospital.

## 3.2 Nature of economic activities

Economic activities refer to all those human activities, which are undertaken to earn a living and thereby satisfy human wants. The main objective of these activities is to earn income and create wealth.

The money earned through work is used to satisfy wants. For example, a teacher teaches in a school or college, a doctor attends to patients in his clinic and a shopkeeper sells goods to his customers.

Economic activities are concerned with the production and distribution of goods and services. These activities create utilities and result in the production of wealth. Economic activities are also called occupations.

The main characteristics of economic activities are as follows:

(i) The motive behind economic activities is to produce goods and services for satisfying human wants.

(ii) Economic activities involve proper allocation of scarce resources so that maximum satisfaction can be obtained from them.

(iii) Economic activities require optimum utilization of land, labour, capital and other factors of production. Welfare of society can be maximized when best use of resources is made.

(iv) Economic activities are undertaken for production of wealth as represented by goods and services. The main motive behind economic activities is to make an economic gain.

(v) Economic activities involve creation of utilities.

## 3.3 Characteristics of economic activities

Economic activities refer to all those human activities, which are undertaken to earn a living and thereby satisfy human wants. The main objects of these activities are to earn income and create wealth.

The money earned through work is used to satisfy wants. For example, a teacher teaches in a school or college, a doctor attends to patients in his clinic and a shopkeeper sells goods to his customers.

Economic activities are concerned with the production, distribution and exchange of goods and services. These activities create utilities and result in the production of wealth. Economic activities are also called occupations.

## 3.3.1 The main characteristics of economic activities are as follows:

## **3.3.1.1 Economic motives**

Economic activities are undertaken to earn money and acquire wealth. The main motive behind these activities is to make an economic gain. Human beings for earning livelihood perform these activities.

#### 3.3.1.2 Productive

Economic activities involve production, distribution and exchange of goods and services for satisfying human wants. These activities are directly related to creation of wealth.

#### **3.3.1.3 Economic resources**

Economic activities make use of economic resources such as land, labour, capital, etc.

## 3.3.1.4 Rational Use

Economic activities require proper allocation of scarce resources to obtain maximum output from them. These activities involve optimum utilization of land, labour, capital and other factors of production. Welfare of society can be maximized when best possible use of resources is made.

## 3.3.1.5 Economic Growth

Economic activities determine the level of economic development of a country and the standard of living of its citizens.

## 3.3.1.6 Legally valid

Human activities performed for economic gain are called economic activities only when they are lawful. Unlawful activities such as gambling, black-marketing, theft, dacoity, smuggling etc., are opposed to public interest. Therefore, these activities cannot be called economic activates.

#### 3.3.1.7 Socially desirable

Economic activities are desirable for society. They must be in accordance with the expectations and norms of society.

## **3.4 Non-Economic Activities**

Activities, which are undertaken to satisfy social, religious cultural and sentimental requirements, are called non-economic activities. The object of these activities is not to earn monetary gain or reward.

People engage in non-economic activities for reasons of love, sympathy, religion, patriotism, etc. For example, a mother looks after her children, a student donates blood, an old man goes to temple daily, a rich man donates money to Prime Minister Relief Fund; a young man helps a blind girl cross the road, etc.

It is the object of any activity that distinguishes between economic and non-economic activities. The primary objective of economic activities is to earn livelihood and create wealth.

On the other hand, the main objective of non-economic activities is to get some sort of social, cultural, religious or recreational satisfaction.

The output of economic activities can be measured in terms of money e.g., the salary of a teacher, the fee of a doctor and the profits of a businessperson. But the result of non-economic activities cannot be measured in terms of money.

The same activity may be economic as well as non-economic. For example, a nurse attending a patient in a hospital is an economic activity as the nurse works for a salary.

But when the same nurse attends to her sick mother at home it is a non-economic activity because the object is not to earn money.

Thus, the activity of the same person may be economic at one-time or place and non-economic at another time or place. The dividing line is not the activity or the person who is doing it but the objective for which it is undertaken.

Thus, non-economic activities are undertaken due to the following considerations:

- (*i*) Love and affection for example taking dinner with the family, cooking food for family.
- (*ii*) Personal satisfaction For example meditating in a park.
- (*iii*) Physical needs for example morning walk by a person.
- (*iv*) Religious obligation for example praying in a temple.
- (v) Social obligations for example helping victims of an accident, flood or earthquake.
- (vi) Patriotism donating blood for injured army men.

#### 3.5 Reasons for which Business is regarded as an economic activity in our country

#### Business is regarded as an economic activity due to the following reasons.

**3.5.1** The object of business is to sell goods or services for Profit. Economic activities are those activities which are undertaken to generate an income. Business is an economic activity because it is carried on as a means of earning money.

Businessmen make money by producing and selling commodities which help to satisfy human wants. For example, a farmer who grows vegetables for the consumption of his family is not engaged in business.

But a farmer who grows vegetables for the purpose of selling them in the market is undertaking a business. His object is to earn income in excess of the cost of growing vegetables. This excess of income over expenditure is called profit. The chief end of any business enterprise is generation of profit and wealth.

**3.5.2** Business Activities Involve Use of Scarce Resources. Business activities require use of scarce resources such as raw materials, labour, capital and other factors of production. A businessman provides the necessary funds from his personal and other sources to meet the capital requirements of his business.

He arranges for the raw materials from the suppliers required to produce the goods. He employs labour to assist the production. Thus, a businessperson has to produce goods utilising various scare resources.

**3.5.3** Business Activities Satisfy Needs of the Public and of Businessmen. Business activities satisfy the needs of the public by making available goods and services.

Public can buy these goods and services and satisfy their needs. Business is a source of income for the businessperson. With the help of this income, he can satisfy his needs as well as the needs of his family members.

Thus, business may be regarded as an economic activity both as a means of generating an income and also as a means of satisfying the wants of society.

#### **Review Questions**

- 1. Define the economic activity?
- 2. Explain the nature of economic activities?
- 3. Explain the characteristics of economic activities?
- 4. Explain the Business as economic activities?

#### **Discussion Questions**

Discuss the economic activities in detail?

## Lesson 4 – Basic economic concept

#### Learning Objectives

- To define the Scarcity.
- To explain the Choice.
- To explain the Preference.
- To describe the Opportunity cost.

#### 4.1 Basic economic concept

## 4.1.1 Scarcity

**Scarcity** is the fundamental economic problem of having seemingly unlimited human wants and needs in a world of limited resources. It states that society has insufficient productive resources to fulfill all human wants and needs. Alternatively, scarcity implies that not all of society's goals can be pursued at the same time; trade-offs are made of one good against others. In an influential 1932 essay, Lionel Robbins defined economics as "the science which studies human behavior as a relationship between ends and scarce means which have alternative uses."

In biology, *scarcity* can refer to the uncommonness or rarity of certain species. Local, national or international law often protects such species in order to prevent extinction.

## 4.1.1.1 Scarcity in Economics

Goods (and services) that are scarce are called economic goods (or simply *goods* if their scarcity is presumed). Other goods are called free goods if they are desired but in such abundance that they are not scarce, such as air and seawater.

Economists study (among other things) how societies perform the allocation of these resources — along with how communities often fail to attain optimality and are instead inefficient. More clearly, scarcity is our infinite wants hitting up against finite resources.

Physical goods are likely to remain inherently scarce by definition. Also some non-physical goods are likely to remain scarce by design, examples include positional goods such as awards generated by honor systems, fame, and membership of elite social groups. These things are said to derive all or most of their value from their scarcity. Even in a theoretical post scarcity society, certain goods, such as desirable land and original art pieces, would most likely remain scarce.

On the other hand, the ease with which some goods can be obtained or replicated (for instance, intellectual property) led to the introduction of artificial scarcity in the form of legal restrictions which limit the availability of such goods.

## 4.1.2 Choice

**Choice** consists of the mental process of judging the merits of multiple options and selecting one or more of them. While a choice can be made between imagined options ("what would I do if ...?"), often a choice is made between real options and followed by the corresponding action. For example, a route for a journey is chosen based on the preference of arriving at a given destination as soon as possible. The preferred (and therefore chosen) route is then derived from information about how long each of the possible routes take. This can be done by a route planner. If the preference is more complex, such as involving the scenery of the route, cognition and feeling are more intertwined, and the choice is less easy to delegate to a computer program or assistant.

More complex examples (often decisions that affect what a person thinks or their core beliefs) include choosing a lifestyle, religious affiliation, or political position.

Most people regard having choices as a good thing, though a severely limited or artificially restricted choice can lead to discomfort with choosing and possibly, an unsatisfactory outcome. In contrast, a choice with excessively numerous options may lead to confusion, regret of the alternatives not taken, and indifference in an unstructured existence; and the illusion that choosing an object or a course leads necessarily to control of that object or course can cause psychological problems.

## 4.1.2.1 Types of choices

There are four main types of decisions, although they can be expressed in different ways. Brian Tracy, who often uses enumerated lists in his talks, breaks them down into:

- 1. Command decisions, which can only be made by you, as the "Commander in Chief"; or owner of a company.
- 2. Delegated decisions, which may be made by anyone, such as the color of the bike shed, and should be delegated, as the decision must be made but the choice is inconsequential. Choice is a concept go parallel with abilities and opportunity. But basically choices are alternatives, abilities are human capacities, opportunities are human possibilities.
- 3. Avoided decisions, where the outcome could be so severe that the choice should not be made, as the consequences cannot be recovered from if the wrong choice is made. This will most likely result in negative actions, such as death.
- 4. "No-brainer" decisions, where the choice is so obvious that only one choice can reasonably be made.
- 5. A fifth type, however, or fourth if three and four are combined as one type, is the collaborative decision, which should be made in consultation with, and by agreement of others. Collaborative Decision Making revolutionized air-traffic safety by not deferring to the captain when a lesser crew member becomes aware of a problem.

Another way of looking at decisions focuses on the thought mechanism used, is the decision:

- Rational
- Intuitive
- Recognition based
- Combination

Recognizing that "type" is an imprecise term, an **alternate way** to classify types of choices is to look at outcomes and the impacted entity. For example, using this approach three types of choices would be:

- Business
- Personal
- Consumer

In this approach, establishing the types of choices makes it possible to identify the related decisions that will influence and constrain a specific choice as well as be influenced and constrained by another choice.

There are many "executive decision maker" products available, such as the decision wheels and the Magic 8-Ball, which randomly produce yes/no or other "decisions" for someone who can not make up their mind or just wants to delegate.

A Ouija board is also a delegated decision.

As a moral principle, those most affected by the decision should make decisions, but this is not normally applied to persons in jail, who might likely make a decision other than to remain in jail. Robert Gates cited this principle in allowing photographs of returning war dead.

## 4.1.2.2 Choice and evaluability in economics

When choosing between options one must make judgments about the quality of each option's attributes. For example, if one is choosing between candidates for a job, the quality of relevant attributes such as previous work experience, college or high school GPA, and letters of recommendation will be judged for each option and the decision will likely be based on these attribute judgments. However, each attribute has a different level of *evaluability*, that is, the extent to which one can use information from that attribute to make a judgment.

An example of a highly evaluable attribute is SAT score. Everyone knows that an SAT score below 800 is very bad while an SAT score above 1500 is exceptionally good. Because the distribution of scores on this attribute is relatively well known, it is a highly evaluable attribute. Compare SAT score to a poorly evaluable attribute, such as number of hours spent doing homework. Most employers would not know what 10,000 hours spent doing homework means because they have no idea of the distribution of scores of potential workers in the population on this attribute.

As a result, evaluability can cause preference reversals between joint and separate evaluations. For example, Hsee, George Loewenstein, Blount & Bazerman (1999) looked at how people choose between options when they are directly compared because they are presented at the same time or when they cannot be compared because one is only given a single option. The canonical example is a hiring decision made about two candidates being hired for a programming job. Subjects in an experiment were asked to give a starting salary to two candidates, Candidate J and Candidate S. However, some viewed both candidates at the same time (joint evaluation), whereas others only viewed one candidate (separate evaluation). Candidate J had experience of 70 KY programs, and a GPA of 2.5, whereas Candidate S had experience of 10 KY programs and a GPA of 3.9. The results showed that in joint evaluation both candidates received roughly the same starting salary from subjects, who apparently thought a low GPA but high experience was approximately equal to a high GPA but low experience. However, in the separate evaluation, subjects paid Candidate S, the one with the high GPA, substantially more money. The

explanation for this is that KY programs is an attribute that is difficult to evaluate and thus people cannot base their judgment on this attribute in separate evaluation.

Personal factors determine food choice. They are preference, associations, habits, ethnic heritage, tradition, values, social pressure, emotional comfort, availability, convenience, economy, image, medical conditions, and nutrition.

## 4.1.2.3 Number of options and the paradox of choice

A number of research studies in economic psychology have focused on how individual behavior differs when the choice set size (the number of choices to choose from) is low versus when it is high. Of particular interest is whether individuals are more likely to purchase a product from a large versus a small choice set. Currently, the effect of choice set size on the probability of a purchase is unclear. In some cases, large choice set sizes discourage individuals from making a choice and in other cases it either encourages them or has no effect. One study compared the allure of more choice to the tyranny of too much choice. Individuals went virtual shopping in different stores that had a randomly determined set of choices ranging from 4 to 16, with some being good choices and some being bad. Researchers found a stronger effect for the allure of more choice. However, they speculate that due to random assignment of number of choices and goodness of those choices, many of the shops with fewer choices included zero or only one option that was reasonably good, which may have made it easier to make an acceptable choice when more options were available.

There is unambiguous evidence that while greater choice has the potential to improve a person's welfare, there is such a thing as too much choice. For example, in one experiment involving a choice of free soda, individuals explicitly requested to choose from six as opposed to 24 sodas, where the only benefit from the smaller choice set would be to reduce the cognitive burden of the choice. A recent study supports this research, finding that human services workers indicated preferences for scenarios with limited options over extensive-options scenarios. As the number of choices within the extensive-options scenarios increased, the preference for limited options increased as well. Attempts to explain why choice can demotivate someone from a purchase have focuses on two factors. One assumes that perusing a larger number of choices imposes a cognitive burden on the individual. The other assumes that individuals can experience regret if they make a suboptimal choice, and sometimes avoid making a choice to avoid experiencing regret.

Further research has expanded on choice overload, suggesting that there is a paradox of choice. As increasing options are available, three problems emerge. First, there is the issue of gaining adequate information about the choices in order to make a decision. Second, having more choices leads to an escalation of expectation. When there are increased options, people's standards for what is an acceptable outcome rise; in other words, choice "spoils you." Third, with many options available, people may come to believe they are to blame for an unacceptable result because with so many choices, they should have been able to pick the best one. If there is one choice available, and it ends up being disappointing, the world can be held accountable. When there are many options and the choice that one makes is disappointing, the individual is responsible.

While it might be expected that it is preferable to keep one's options open, research has shown that having the opportunity to revise one's decisions leaves people less satisfied with the decision outcome. A recent study found that participants experienced higher regret after having made a reversible decision. The results suggest that reversible decisions cause people to continue to think about the still relevant choice options, which might increase dissatisfaction with the decision and regret.

Individual personality plays a significant role in how individuals deal with large choice set sizes. Psychologists have developed a personality test that determines where an individual lies on the satisficermaximizer spectrum. A maximizer is one who always seeks the very best option from a choice set, and may anguish after the choice is made as to whether it was indeed the best. Satisficers may set high standards but are content with a good choice, and place less priority on making the best choice. Due to this different approach to decision-making, maximizers are more likely to avoid making a choice when the choice set size is large, probably to avoid the anguish associated with not knowing whether their choice was optimal. One study looked at whether the differences in choice satisfaction between the two are partially due to a difference in willingness to commit to one's choices. It found that maximizers reported a stronger preference for retaining the ability to revise choices. Additionally, after making a choice to buy a poster, satisficers offered higher ratings of their chosen poster and lower ratings of the rejected alternatives. Maximizers, however, were less likely to change their impressions of the posters after making their choice which left them less satisfied with their decision.

Maximizers are less happy in life, perhaps due to their obsession with making optimal choices in a society where people are frequently confronted with choice. One study found that maximizers reported significantly less life satisfaction, happiness, optimism, and self-esteem, and significantly more regret and depression, than did satisficers. In regards to buying products, maximizers were less satisfied with consumer decisions and were more regretful. They were also more likely to engage in social comparison, where they analyze their relative social standing among their peers, and to be more affected by social comparisons in which others appeared to be in higher standing than them. For example, maximizers who saw their peer solve puzzles faster than themselves expressed greater doubt about their own abilities and showed a larger increase in negative mood. On the other hand, people who refrain from taking better choices through drugs or other forms of escapism tend to be much happier in life.

Others say that there is never too much choice and that there is a difference between happiness and satisfaction: a person who tries to find better decisions will often be dissatisfied, but not necessarily unhappy since his attempts at finding better choices did improve his lifestyle (even if it wasn't the *best decision* he will continually try to *incrementally improve* the decisions he takes).

Choice architecture is the process of encouraging people to make good choices through grouping and ordering the decisions in a way that maximizes successful choices and minimizes the number of people who become so overwhelmed by complexity that they abandon the attempt to choose. Generally, success is improved by presenting the smaller or simpler choices first, and by choosing and promoting sensible default options.

## 4.1.2.4 Relationship to identity

Choices, especially choices made by consumers, may carry symbolic meaning and speak to a person's self-identity. In general, the more utilitarian the item is, the less the choice says about the person's self-concept. Purely utilitarian items, such as a fire extinguisher, may be chosen solely for function, but non-utilitarian items, such as music, clothing fashions, or home decorations, are choices made with the person's identity in mind.

## 4.1.3 Preference (economics)

In economics and other social sciences, **preference** refers to the set of assumptions related to ordering some alternatives, based on the degree of happiness, satisfaction, gratification, enjoyment, or utility they provide, a process which results in an optimal "choice" (whether real or theoretical). Although economists

are usually not interested in choices or preferences in themselves, they are interested in the theory of choice because it serves as a background for empirical demand analysis.

## 4.1.3.1 History

Ragnar Frisch was the first to write preference relations using the mathematics of axioms, in 1926. Up to then, economists had developed an elaborated theory of demand that omitted *primitive characteristics* of people. This changed at the end of the 19th and the beginning of the 20th century, when logical positivism started to affect economics through the notion that any theoretical concept used in a theory should be related to observables. Whereas economists in the 18th and 19th century, they felt that it needed more of an empirical structure. Because binary choices are directly observable, it instantly appealed to economists. The search for observables in microeconomics is taken even further by revealed preference theory.

Since the pioneer efforts of Frisch in the 1920s, one of the major issues which has pervaded the theory of preferences is the representability of a preference structure with a real-valued function. This has been achieved by mapping it to the mathematical index called *utility*. Gérard Debreu, influenced by the ideas of the Bourbaki group, championed the axiomatization of consumer theory in the 1950s, and the tools he borrowed from the mathematical field of binary relations have become mainstream since then. Even though the economics of choice can be examined either at the level of utility functions or at the level of preferences, to move from one to the other can be useful. For example, shifting the conceptual basis from an abstract preference relation to an abstract utility scale results in a new mathematical framework, allowing new kinds of conditions on the structure of preference to be formulated and investigated.

Another historical turnpoint can be traced back to 1895, when Georg Cantor, proved in a theorem that if a binary relation is *linearly ordered*, then it is also isomorphically embeddable in the ordered real numbers. This notion would become very influential for the theory of preferences in economics: by the 1940s prominent authors such as Paul Samuelson, would theorize about people actually having weakly ordered preferences.

## 4.1.3.2 Basic premises

In consumer theory, economic actors are thought of as being confronted with a set of possible consumption bundles or commodity space. Of all the available bundles of goods and services, only one is ultimately chosen. The theory of preferences seeks an analytical solution to the problem of getting to this ultimate choice (the optimal choice) using a *system of preferences* within a budgetary limitation. Choice is an act, whereas preferences are a state of mind.

In reality, people do not necessarily rank or order their preferences in a consistent way. In preference theory, some idealized conditions are regularly imposed on the preferences of economic actors. One of the most important of these idealized conditions is the *axiom of transitivity*:

If alternative A is preferred to alternative B, and B to C, then A is preferred to C.

The language of binary relations allow one to write down exactly what is meant by "ranked set of preferences", and thus gives an unambiguous definition of *order*. A preference relation should not be confused with the order relation  $\geqslant$  used to indicate which of two real numbers is larger. Order relations satisfy an extra condition:

## $A \ge B$ , and $B \ge A$ , implies A = B

which does not always hold in preference relations; hence, an *indifference relation* is used in its place (the symbol ~denotes this kind of relation).

A system of preferences or *preference structure* refers to the set of qualitative relations between different alternatives of consumption. For example, if the alternatives are:

- Apple
- Orange
- Banana

In this example, a preference structure would be:

"The apple is at least as preferred as the orange", and "The orange is as least as preferred as the Banana". One can use to symbolize that some alternative is "at least as preferred as" another one, which is just a binary relation on the set of alternatives. Therefore:

- Apple Corange
- Orange **Z**Banana

The former qualitative relation can be preserved when mapped into a numerical structure, if we impose certain desirable properties over the binary relation: these are the *axioms of preference order*. For instance: Let us take the apple and assign it the arbitrary number 5. Then take the orange and let us assign it a value lower than 5, since the orange is less preferred than the apple. If this procedure is extended to the banana, one may prove by induction that if u is defined on {apple, orange} and it represents a well-defined binary relation called "at least as preferred as" on this set, then it can be extended to a function u defined on {apple, orange, banana} and it will represent "at least as preferred as" on this larger set.

Example:

- Apple = 5
- Orange = 3
- Banana = 2

5 > 3 > 2 = u(apple) > u(orange) > u(banana)

and this is consistent with Apple  $\gtrsim$ Orange, and with Orange  $\gtrsim$ Banana.

## 4.1.3.3 Axioms of order

• Completeness: for all A and B we have  $A \succeq B_{\text{or}} B \succeq A_{\text{or both.}}$ 

In order for preference theory to be useful mathematically, we need to assume continuity. **Continuity** simply means that there are no 'jumps' in people's preferences: if we prefer very large oranges to apples, we will prefer large oranges to apples as well. In mathematical terms, if we prefer point A along a preference curve to point B, points very close to A will also be preferred to B. This allows preference

curves to be differentiated. The continuity assumption is "too strong" in the sense that it indeed guarantees the existence of a *continuous utility function* representation. Continuity is, therefore, a sufficient condition, but not a necessary one.

Although some authors include reflexivity as one of the axioms required to obtain representability (this axiom states that  $A \succeq A$ ), it is redundant inasmuch as the completeness axiom implies it already.

## 4.1.3.4 Most commonly used axioms

- Order-theoretic: acyclicity, transitivity, the semiorder property, completeness
- Topological: continuity, openness or closedness of the preference sets
- Linear-space: convexity, homogeneity, translation-invariance

## 4.1.3.5 Normative interpretations of the axioms

Everyday experience suggests that people at least talk about their preferences as if they had personal "standards of judgment" capable of being applied to the particular domain of alternatives that present themselves from time to time. Thus, the axioms are an attempt to model the decision maker's preferences, not over the actual choice, but over the type of desirable procedure (a procedure that any human being would like to follow). Behavioral economics investigates inconsistent behavior (i.e. behavior that violates the axioms) of people. Believing in axioms in a normative way does not imply that it is mandatory to behave according to them. Instead, they are a mode of behavior suggested; it's what people would like to see themselves following.

Here is an illustrative example of the normative implications of the theory of preferences: Consider a decision maker who needs to make a choice. Assume that this is a choice of where to live or whom to marry and that the decision maker has asked an economist for advice. The economist, who wants to engage in normative science, attempts to tell the decision maker how she should make decisions.

Economist: I suggest that you attach a utility index to each alternative, and choose the alternative with the highest utility.

Decision Maker: You've been brainwashed. You think only in terms of functions. But this is an important decision, there are people involved, emotions, these are not functions!

Economist: Would you feel comfortable with cycling among three possible options? Preferring x to y, and then y to z, but then again z to x?

Decision Maker: No, this is very silly and counterproductive. I told you that there are people involved, and I do not want to play with their feelings.

Economist: Good. So now let me tell you a secret: if you follow these two conditions -making decision, and avoid cycling, then you can be described as if you are maximizing a utility function.

Consumers whose preference structures violate transitivity would get exposed to being milked by some unscrupulous person. For instance, Maria prefers apples to oranges, oranges to bananas, and bananas to apples. Let her be endowed with an apple, which she can trade in a market. Because she prefers bananas to apples, she is willing to pay, say, one cent to trade her apple for a banana. Afterwards, Maria is willing

to pay another cent to trade her banana for an orange, and again the orange for an apple, and so on. There are other examples of this kind of "irrational" behavior.

Completeness implies that some choice will be made, an assertion that is more philosophically questionable. In most applications, the set of consumption alternatives is infinite and the consumer is not conscious of all preferences. For example, one does not have to choose over going on holiday by plane or by train: if one does not have enough money to go on holiday anyway then it is not necessary to attach a preference order to those alternatives (although it can be nice to dream about what one would do if one would win the lottery). However, preference can be interpreted as a hypothetical choice that could be made rather than a conscious state of mind. In this case, completeness amounts to an assumption that the consumers can always make up their mind whether they are indifferent or prefer one option when presented with any pair of options.

Under some extreme circumstances there is no "rational" choice available. For instance, if asked to choose which one of one's children will be killed, as in Sophie's Choice, there is no rational way out of it. In that, case preferences would be incomplete, since "not being able to choose" is not the same as "being indifferent".

The *indifference relation* ~ is an equivalence relation. Thus we have a quotient set S/~ of equivalence classes of S, which forms a partition of S. Each equivalence class is a set of packages that is equally preferred. If there are only two commodities, the equivalence classes can be graphically represented as indifference curves. Based on the preference relation on S we have a preference relation on S/~. As opposed to the former, the latter is antisymmetric and a total order.

## 4.1.3.6 Applications to theories of utility

In economics, a utility function is often used to represent a preference structure such that  $u(A) \ge u(B)_{\text{if}}$  and only if  $A \succeq B$ . When a preference order is both transitive and complete, then it is standard practice to call it a *rational preference relation*, and the people who comply with it are *rational agents*. A transitive and complete relation is called a *weak order* (or *total preorder*). The literature on preferences is far from being standardized regarding terms such as *complete, partial, strong*, and *weak*. Together with the terms "total", "linear", "strong complete", "quasi-orders", "pre-orders" and "sub-orders", which also have a different meaning depending on the author's taste, there has been an abuse of semantics in the literature.

According to Simon Board, a continuous utility function always exists if  $\gtrsim$  is a continuous rational preference relation on  $\mathbb{R}^n$ . For any such preference relation, many continuous utility functions represent it. Conversely, every utility function can be used to construct a unique preference relation.

All the above is independent of the prices of the goods and services and of the budget constraints faced by consumers. These determine the *feasible* bundles (which they can afford). According to the standard theory, consumers chooses a bundle within their budget such that no other feasible bundle is preferred over it; therefore their utility is maximized.

## 4.1.3.7 Primitive equivalents of some known properties of utility functions

- An increasing utility function is associated with a monotonic preference relation.
- A utility function that is non-constant in the neighborhood of x is associated with a locally nonsatiated preference order.
- Quasi-concave utility functions are associated with a convex preference order. When non-convex preferences arise, the Shapley–Folkman lemma is applicable.
- Weakly separable utility functions are associated with the weak separability of preferences.

## 4.1.3.8Lexicographic preferences

Lexicographic preferences are a special case of preferences that assign an infinite value to a good, when compared with the other goods of a bundle.

## 4.1.3.9Strict versus weak

The possibility of defining a strict preference relation  $\succ$  from the weaker one  $\gtrsim$ , and viceversa, suggest in principle an alternative approach of starting with the strict relation  $\succ$  as the primitive concept and deriving the weaker one and the indifference relation. However, an indifference relation derived this way will generally not be transitive. According to Kreps "beginning with strict preference makes it easier to discuss no comparability possibilities".

## 4.1.3.10 Agreggation

Under certain assumptions, individual preferences can be aggregated onto the preferences of a group of people. As a result of aggregation, Arrow's impossibility theorem states that voting systems sometimes can not convert individual preferences into desirable community-wide acts of choice.

#### 4.1.3.11Expected utility theory

Preference relations can also be applied to a space of simple lotteries, as in expected utility theory. In this case, a preference structure over lotteries can also be represented by a utility function.

## 4.1.3.12 Criticism

Some critics say that rational theories of choice and preference theories rely too heavily on the assumption of invariance, which states that the relation of preference should not depend on the description of the options or on the method of elicitation. However, without this assumption, one's preferences cannot be represented as maximization of utility.

#### **4.1.4 Opportunity cost**

In microeconomic theory, the **opportunity cost** of a choice is the value of the best alternative forgone, in a situation in which a choice needs to be made between several mutually exclusive alternatives given limited resources. Assuming the best choice is made, it is the "cost" incurred by not enjoying the benefit that would be had by taking the second best choice available. The *New Oxford American Dictionary* defines it as "the loss of potential gain from other alternatives when one alternative is chosen". Opportunity cost is a key concept in economics, and has been described as expressing "the basic relationship between scarcity and choice". The notion of opportunity cost plays a crucial part in ensuring that scarce resources are used efficiently. Thus, opportunity costs are not restricted to monetary or financial costs: the real cost of output forgone, lost time, pleasure or any other benefit that provides utility should also be considered opportunity costs.

## 4.1.4.1 History

The term was coined in 1914 by Austrian economist Friedrich von Wieser in his book *Theorie der gesellschaftlichen Wirtschaft*. It was first described in 1848 by French classical economist Frédéric Bastiat in his essay "What Is Seen and What Is Not Seen".

## 4.1.4.2Opportunity costs in consumption

Opportunity cost may be expressed in terms of anything which is of value. For example, an individual might decide to use a period for travel rather than to do household repairs. The opportunity cost of the trip could be said to be the forgone home renovation.

## 4.1.4.3Opportunity costs in production

Opportunity costs may be assessed in the decision-making process of production. If the workers on a farm can produce either one million pounds of wheat or two million pounds of barley, then the opportunity cost of producing one pound of wheat is the two pounds of barley forgone (assuming the production possibilities frontier is linear). Firms would make rational decisions by weighing the sacrifices involved.

## 4.1.4.4Explicit costs

Explicit costs are opportunity costs that involve direct monetary payment by producers. The opportunity cost of the factors of production not already owned by a producer is the price that the producer has to pay for them. For instance, a firm spends \$100 on electrical power consumed; their opportunity cost is \$100. The firm has sacrificed \$100, which could have been spent on other factors of production.

## 4.1.4.5Implicit costs

Implicit costs are the opportunity costs in factors of production that a producer already owns. They are equivalent to what the factors could earn for the firm in alternative uses, either operated within the firm or rent out to other firms. For example, a firm pays \$300 a month all year for rent on a warehouse that only holds product for six months each year. The firm could rent the warehouse out for the unused six months, at any price (assuming a year-long lease requirement), and that would be the cost that could be spent on other factors of production.

#### 4.1.4.6Non-monetary opportunity costs

Opportunity costs are not always monetary units or being able to produce one good over another. The opportunity cost can also be unknown, or spawn a series of infinite sub opportunity costs. For instance, an individual could choose not to ask a girl out on a date, in an attempt to make her more interested ("playing hard to get"), but the opportunity cost could be that they get ignored - which could result in other opportunities being lost.

#### 4.1.4.7Evaluation

Note that opportunity cost is not the *sum* of the available alternatives when those alternatives are, in turn, mutually exclusive to each other - it is the value of the *next best* use. The opportunity cost of a city's decision to build the hospital on its vacant land is the loss of the land for a sporting center, or the inability

to use the land for a parking lot, or the money which could have been made from selling the land. Use for any one of those purposes would preclude the possibility to implement any of the other.

## **Review Questions**

- 1. Define the Scarcity?
- 2. Explain the Choice?
- 3. Explain the Preference?
- 4. Explain the Opportunity cost?

**Discussion Questions** 

Discuss the basic economic concepts in details?

#### **Demand analysis**

## Lesson 1 – Utility analysis

#### Learning Objectives

- To define the Utility.
- To explain the Law of Demand.
- To explain the Marginal Utility.
- To describe the Utility maximization.

# 1.1 Utility

Utility is another term for the satisfaction of wants and needs obtained from the consumption of goods. Two other economic terms that are also frequently used to capture this notion are welfare and well-being. Whichever term is used, the underlying concept is the same: Utility is the extent to which unlimited wants and needs are fulfilled using the goods and services produced from society's limited resources. The utility concept is an integral part of consumer demand theory and the in-depth study of market demand, the demand curve, and the law of demand.

## 1.1.1Beyond Useful

The official, technical economic use of the term "utility" is not interchangeable with the common, everyday synonym "useful." When used in the analysis of consumer behavior, utility assumes a very precise meaning.

For example, a common "utility" knife is one with many uses, something that is handy to have around. In baseball, a "utility" player can perform quite well at several different positions and is thus useful to have on the team. Moreover, a public "utility" is a company that supplies a useful product, such as electricity, natural gas, or trash collection.

In contrast, the specific economic use of the term utility in the study of consumer behavior means the satisfaction of wants and needs obtained from the consumption of a commodity. The good consumed need not be "useful" in the everyday sense of the term. It only needs to provide satisfaction.

In other words, a frivolous good that has little or no practical use, can provide as much utility as a more useful good.

• An Omni Straight Shoestring Straightened is a useful good. It can be used to straighten even the most severely tangled shoestrings. It can also straighten telephone cords, computer cables, and fishing lines.

• In contrast, a FlexStar Interactive Trophy Plaque that periodically blares out "Congratulations, you took third place in the 27th Annual Shady Valley Badminton Tournament," is not very useful. It hangs on the wall broadcasting the same proclamation to every passerby.

Is the FlexStar Interactive Trophy Plaque useful? Hardly!

But it does provide utility. By noting a past accomplishment that took years to achieve, this plaque provides utility. Each time the message is broadcast, the owner gets a warm, fuzzy feeling inside. It satisfies the owner's desire to be recognized for this wondrous achievement. It does provide utility.

In fact, both items provide utility. Both items satisfy wants and needs.

## 1.1.2 But Not Quantifiable

When analyzing consumer demand, economists are prone to use phrases like "level of utility." However, in spite what this phrase implies, utility is NOT, strictly speaking, quantifiable like many other human characteristics, such as height and weight. For example, the height and weight of Maurice Finklestein can be quantified at 54 inches and 347 pounds. These measures suggest a mental image of Maurice as being somewhat short and somewhat heavy--a rolly, polly fellow--with the geometric configuration of an overinflated beach ball.

This mental picture of Maurice can be had without actually knowing Maurice or having ever seen Maurice up close and personal. The reason is the existence of standard height and weight benchmark measures--inches and pounds. But these are standard benchmarks because they measure characteristics (height and weight) that ARE measurable.

Not only are they measurable, but they are also comparable between people. Lisa Quirkenstone, by contrast is 70 inches tall and 118 pounds. The image of a runway fashion model might come to mind with these quantified dimensions.

Moreover, a direct comparison between Lisa and Maurice can be had with these numbers. Lisa is somewhat taller and definitely thinner. In fact, Lisa is 16 inches taller and 229 pounds lighter, which also means that Lisa is 30 percent taller and 66 percent lighter than Maurice.

Utility, however, is NOT a quantifiable, measurable, comparable characteristic--at least based on a current understanding of human psychology. It falls into the same "immeasurable" category as happiness, beauty, and love. There are no benchmark measures for these notions. Much like "beauty is in the eye of the beholder," so too is utility. Even though economists make extensive use, for instructional purposes, of the utility measurement unit termed "util," any such utility unit is purely hypothetical and only designed to make the presentation of assorted utility-related concepts easier.

## 1.1.3 Utility analysis

Utility analysis, a subset of consumer demand theory, provides insight into an understanding of market demand and forms a cornerstone of modern microeconomics. In particular, this analysis investigates consumer behavior, especially market purchases, is based on the satisfaction of wants and needs (that is, utility) generated from the consumption of a good.

Utility analysis is primarily taught in introductory courses. A more sophisticated version of consumer demand theory relies on the analysis of indifference curves and is more commonly found at the intermediate course level and above.

## 1.1.4 Utility and Satisfaction

The primary focus of utility analysis is on the satisfaction of wants and needs obtained by the consumption of goods. This is technically termed utility. The utility generated from consumption affects the decision to purchase and consume a good.

When used in the analysis of consumer behavior, utility assumes a very precise meaning, which differs from the everyday use of the term. In common use, the term utility means "useful." For example, a "utility" knife is one with many uses, something that is handy to have around. In baseball, a "utility" player can perform quite well at several different positions and is thus useful to have on the team. Moreover, a public "utility" is a company that supplies a useful product, such as electricity, natural gas, or trash collection.

In contrast, the specific economic use of the term utility in the study of consumer behavior means the satisfaction of wants and needs obtained from the consumption of a commodity. The good consumed need not be "useful" in the everyday sense of the term. It only needs to provide satisfaction.

In other words, a frivolous good that has little or no practical use, can provide as much utility as a more useful good.

- An OmniOpen Deluxe Can Opener is extremely useful, especially when a sealed can needs to be opened.
- An autographed photo of Brace Brickhead, Medical Detective, is not very useful. It does nothing but rest peacefully in a picture frame.

Both items, however, provide utility. Both items satisfy wants and needs. The OmniOpen Deluxe Can Opener obviously makes it possible to open cans of food which satisfy the hunger need. The autographed photo of Brace Brickhead provides the owner with a warm, fuzzy feeling and a reminder of the time spent enjoying the thrilling exploits of Brace Brickhead, Medical Detective.

## 1.1.5 The Law of Demand

The primary focus of utility analysis is an understanding of market demand and the law of demand. The law of demand, which gives rise to a negatively sloped demand curve, is an essential principle underlying market analysis. Modern microeconomic theory, among other topics, is concerned with understanding and explaining the law of demand.

The explanation of the law of demand using utility analysis is relatively simple. Consumers purchase goods that satisfy wants and needs, that is, generate utility. Those goods that generate more utility are more valuable to consumers and thus buyers are willing to pay a higher price. The key to the law of demand is that the utility generated declines as the quantity consumed increases. As such, the demand price that buyers are willing to pay decreases as the quantity demanded increases.

Utility analysis begins with the total utility derived from the consumption of different quantities of a good. Total utility is simply a measure of the total satisfaction of wants and needs obtained from the consumption or use of a good or service. It is often convenient to present total utility for a range of quantities in a table such as the one displayed to the right.

Distant	Total
Rides	(util)
0	0
1	11
2	20
3	27
4	32
5	35
6	36
7	35
8	32

Utility analysis is based on the presumption that the amount of utility generated from the consumption of a good can be explicitly measured. The standard hypothetical measurement unit is "utils."

Suppose, for example, that Edgar Millbottom spends a day riding the Monster Loop Death Plunge roller coaster at the Shady Valley Amusement Park, then records the amount of total utility achieved at the end of each ride. The two columns presented in the table measure the number of rides and the total utility accumulated by Edgar at the end of each ride (in utils).

- Before his first ride, Edgar receives no utility. No activity, no utility.
- Edgar's first ride generates 11 utils of utility.
- The total utility generated if Edgar takes 8 rides is 32 utils.
- Edgar's utility increases for the first 6 rides, reaching a high of 36 utils, before declining back to 32 utils for the 8th ride.
- Presumably Edgar's utility continues to decline after the 8th ride.
- Edgar obtains the highest total utility from 6 rides on the roller coaster.

The motivation that guides Edgar's roller coaster riding is to maximize utility, that is, to consume the quantity of the good that generates the highest level of utility. In this example, utility is maximized at 6 rides.

In many situations, however, the consumption of a good faces constraints. Edgar, for example, might face a time constraint because he plans to attend a live concert of the rock-and-roll group, Live Headless Squirrels, that prevents him from riding more than 4 times. Or he might face an income constraint because the amusement park charges \$1 per ride and he has only \$5 in his pocket.

In these situations Edgar, as well as other consumers, might pursue constrained utility maximization. This means achieving the highest possible utility, given certain restrictions that prevent the highest overall level of utility from being achieved.

# 1.1.7 Marginal Utility

Total utility is used as a starting point for utility analysis. However, a great deal of additional insight is gained from marginal utility. Marginal utility is the additional utility, or extra satisfaction of wants and needs, obtained from the consumption or use of an additional unit of a good or service. Marginal utility is, in other words, the extra satisfaction gained from an extra unit of good.

Marginal utility is specified as:

change in total utility

marginal utility =

change in quantity

If, for example, total utility increases from 20 to 27 utils, then marginal utility is 7 utils.

The far right column of this table presents marginal utility values derived from each ride Edgar undertakes. Marginal utility from the first ride is 11 utils. The extra utility generated by the second ride is 9 utils. The third ride provides another 7 utils. The remaining numbers in the right column are interpreted in a similar manner.

Marginal utility provides a direct link between utility analysis and demand. The demand price a buyer is willing to pay for a given good is based on the marginal utility derived from consuming the good. In this example, Edgar is most likely willing is to pay more for the first ride than the fifth ride, in that the first ride generates 11 utils of satisfaction, but the fifth ride generates only 3 utils.

# 1.1.8 The Law of Diminishing Marginal Utility

A clear pattern is displayed by the marginal utility values in the far right column. Marginal utility decreases as Edgar takes more rides. This decreasing marginal utility reflects the law of diminishing marginal utility. The law of diminishing marginal utility states that marginal utility, or the extra utility obtained from consuming a good, decreases as the quantity consumed increases. In essence, each additional good consumed is less satisfying than the previous one. This law is particularly important for insight into market demand and the law of demand.

If each additional unit of a good is less satisfying, then a buyer is willing to pay less. As such, the demand price declines. This inverse law of demand relation between demand price and quantity demanded is a direct implication of the law of diminishing marginal utility.

## **1.1.9 Utility maximization**

Utility maximization is the guiding notion-underlying consumer choices analyzed with consumer demand theory and utility analysis. It makes sense to think that people are generally motivated to do what is best for them, to purchase the most satisfying goods, to make the decisions that do more good than harm, to improve their overall living standards and well-being, that is, to maximize their utility.

Working through the logical consequences of this assumption, when combined with other principles of consumer behavior especially the law of diminishing marginal utility, makes it possible to gain insight into such things market demand and the law of demand.

## **1.1.10 The Scarcity Connection**

The utility maximization goal is based on the seemingly obvious presumption that people prefer more to less. This presumption is tied to the unlimited wants and needs aspect of scarcity. In other words, because people have unlimited wants and needs, satisfying those wants and needs is a desirable thing to do. Someone like Duncan Thurly would rather have a full belly than an empty one. He would rather live in a cozy, climate-controlled house than in a cardboard box under a bridge.

#### **Marginal Utility**

Rides	Total Utility (util)	Marginal Utility (util)
0	0	
1	11	11
2	20	9
3	27	7
- 4	32	5
5	35	3
6	36	1
7	35	-1
8	32	-3

Of course, if wants and needs are unlimited, can anyone actually maximize utility? That is, can Duncan ever achieve the absolute pinnacle of satisfaction? Can he actually maximize utility. In terms of the scarcity problem, probably not. He might be able to boost utility a little higher by satisfying another unfulfilled want or need. But he is unlikely to maximize utility totally and completely. This is one reason why it is reasonable to think of utility maximization as a process of seeking what is ultimately unreachable.

However, in the analysis of consumer demand theory, utility maximization has a more pragmatic interpretation--obtaining the highest possible satisfaction from consuming a given good or undertaking a specific activity. While Duncan might not be able to maximize his OVERALL utility, he can maximize the utility obtained from eating Hot Momma Fudge Bananarama Ice Cream Sundaes. It is this pragmatic interpretation of utility maximization that pervades the study of economics.

## **1.1.11 Utility Analysis**

The accompanying table can be used to illustrate utility maximization. The numbers indicate the total utility obtained by Edgar Millbottom while riding the Monster Loop Death Plunge roller coaster at the Shady Valley Amusement Park. The right-hand column is the accumulated satisfaction Edgar receives from riding the Monster Loop Death Plunge roller coaster 8 times during his day at the amusement park.

The numbers indicate that Edgar receives the greatest total utility, 36 utils, by riding the Monster Loop Death Plunge roller coaster 6 times. Click the [Utility Max] button to highlight this quantity. Taking 5 trips around the Monster Loop Death Plunge roller coaster track generates only 35 utile. Likewise, 7 rides generate only 35 utils. Maximum utility comes from 6 rides and only 6 rides. Anything else comes in less.

#### 1.11.12 The Peak of the Curve

## **Roller Coaster Utility**

	Total
Rides	Utility
	(util)
0	0
1	11
2	20
3	27
4	32
5	35
6	36
7	35
8	32





Utility maximization can be visually identified with a total utility curve, such as the one presented in this exhibit. In

this case the maximum level of utility obtained by Edgar

riding the Monster Loop Death Plunge roller coaster is relatively obvious. The total utility curve reaches its highest point for 6 roller coaster rides. the curve increases up to the sixth ride, then declines for subsequent rides.

# 1.1.13 Real World Constraints

In the real world, the goal of utility maximization often encounters obstacles that prevent obtaining the highest overall level of utility. In many circumstances, consumers are unable to reach the peak of the total utility curve. Under these circumstances, consumers face a constrained utility maximization.

The constraints could be physical or legal. For example, Edgar might not be able to ride the Monster Loop Death Plunge roller coaster 6 times because a bolt of lightning struck the track destroying a large section or perhaps the Shady Valley Amusement Park obtained a court order preventing Edgar for entering the park.

However, the constraints facing most consumers most of the time are economic--that is, they have limited income and cannot afford to buy as much of a good as they want. If Edgar is charged \$1 per ride and has only \$5 of cash, then he is not able to achieve the utility maximizing 6 rides.

## 1.1.14 The Essence of Life

While regular, everyday, noneconomic folks seldom use the term utility maximization, it is a powerful motivation force underlying a great deal (if not all) of the decisions people make and the actions they take. Again make note of the close connection between utility maximization, unlimited wants and needs, and the pervasive problem of scarcity.

While Duncan might buy a freshly prepared Hot Momma Fudge Bananarama Ice Cream Sundae because it just "sounds tasty," what he is really trying to do is to raise his utility level to its maximum. He is motivated to eat the hot fudge sundae because it adds more to his utility total. And if he can add to his utility total, then he is not AT the maximum.

## 1.1.15 Utility measurement

Utility measurement provides a basis for discussing the satisfaction of wants and needs derived from consumption, which then enables an understanding of the role utility plays in market demand. When economists began looking into the influence utility has on price in the 1800s, they presumed that utility was a characteristic, like height and weight that could be measured in a cardinal manner.

However, as the study of consumer demand theory progressed, economists realized that cardinal utility was both unlikely and unneeded. Ordinal utility, the ranking or preferences, was not only more realistic, it also provided a sufficient theoretical basis for analyzing the connection between utility and market demand.

# 1.1.16 Cardinal Utility

Cardinal utility is the measurement of satisfaction using numerical values (1, 2, 3, etc.) that are comparable and based on a benchmark or scale. Height and weight are common cardinal measures.

• Suppose, for example, that Winston Smythe Kennsington III is 72 inches tall and weighs 180 pounds. In contrast, Pollyanna Pumpernickel is 64 inches tall and weighs 100 pounds. Anyone can easily conclude that Winston is taller and heavier than Paula.

However, these cardinal measures also make it possible to compare how much taller and heavier Winston is than Paula. In fact, Winston is 12.5 percent taller and 80 percent heavier than Paula.

• Now consider the height and weight of Barton Broadway, a hulking professional athlete, who is 81 3/4 inches tall and weighs 324 pounds. These cardinal measures indicate that Barton is 12.5 percent taller and 80 percent heavier than Winston. The proportional difference between Barton and Winston is the same as that between Winston and Paula.

Herein lies the benefit of cardinal utility. It is (or would be) based on a fixed scale that allows for comparisons among consumers.

Unfortunately, such cardinal measurement does not presently exist for utility. The theoretical prospects of generating such a measurement are also slight. Although early economists worked from the presumption that utility could be quantified with a cardinal measure similar that used for height and weight, the subjective nature of utility makes cardinal measurement unlikely.

Utility is inherently subjective. The satisfaction Pollyanna Pumpernickel obtains from eating a hot fudge sundae is based on her own personal wants and needs, her likes and dislikes. There is no way to compare her satisfaction with that received from an identical hot fudge sundae consumed by Winston Smythe Kennsington III or Barton Broadway.

There is no way to measure how much more or less satisfaction each person receives. Does Barton receive 12.5 percent more utility than Winston? Does Winston receive 12.5 percent more than he receive Paula? Who can say?

Moreover, there also is no way to compare the satisfaction Paula receives from a hot fudge sundae versus watching Barton Broadway participate in his professional sporting pursuit. Does Paula receive 80 percent more utility from a hot fudge sundae than from watching Barton? Who can say?

## 1.1.17 Ordinal Utility

Ordinal utility is the ranking of preferences (first, second, third, etc.) that are only comparable on a relative basis. Sporting events are commonly subject to ordinal measures.

Suppose, for example, Pollyanna Pumpernickel, Winston Smythe Kennsington III, and Barton Broadway engage in a friendly footrace. Being a highly trained, well-conditioned athlete, Barton finishes first. The petite, but tenacious, Paula comes in second. Winston, hobbled by an old knee injury comes in third.

The ranking achieved by these three runners depends only about their finish. It matters not how swiftly each one covers the distance.

- Suppose that Barton edges out Paula by the slimmest of margins for first place, while Winston finishes well behind.
- Or alternatively, suppose that Barton finishes well in front, while Paula edges Winston by the slimmest of margins for second place.

• Or lastly, suppose that each finishes the race at almost the same time, with Barton coming in just ahead of Paula, who is slightly in front of Winston.

The absolute difference between each runner is irrelevant to the order of finish. Barton is awarded the gold medal for first. Paula receives the silver medal for second. And Winston has the bronze medal for third.

Ordinal utility applies this ranking to preferences. In the modern analysis of consumer demand, the actual level of utility generated from the consumption of a good is irrelevant. Only the ranking of preferences is important.

Does Paula like hot fudge sundaes 80 percent more than watching Barton perform athletic activities? It matters not. It only matters that she likes hot fudge sundaes more than Barton's endeavors.

## Review Questions

- 1. Define the Utility?
- 2. Explain the Law of Demand?
- 3. Explain the Marginal Utility?
- 4. Explain the Utility maximization?

#### **Discussion Questions**

#### Discuss the Utility measurement?

### Lesson 2 - Nature of demand and determinants

#### Learning Objectives

- To define the Demand in economics.
- To explain the determinants of Demand.
- To explain the determinants of Price Elasticity of Demand.
- To describe the commodity in consumer's budget.

## 2.1 What is demand in Economics

In Economics demand shows the relationship between the prices of a commodity and the quantity of the commodity which the consumer wants to buy at those prices. Demand in Economics is essentially the attitude and reaction of a consumer towards the commodity he wants to buy. Mere desire or wants for a commodity does not constitute demand in Economics.

The desire for a commodity backed by ability and willingness to pay is said to be true demand or effective demand in Economics. A poor beggar who hardly makes both ends meet may wish to have a car but his wish or desire will not constitute demand for car as he can't afford to pay for it although he has desire and willingness to pay.

Thus three things are essential for a desire for a commodity to become effective demand- (1) desire for a .commodity, (2) willingness to pay (3) ability to pay for the commodity.

Demand is meaningless without reference to price and time. The amount demanded must refer to some period of time viz. a year, a month or a week. Demand is expressed with reference to a particular point of time. Likewise demand is always at a price. It means the amount demanded bought at particular going price. The desire without price is not demand in Economics.

Precisely states the demand for a commodity is-the quantity of if that a consumer will buy at various given prices at a given moment of time. Benham states "the demand for anything at given price is the amount of it which will be bought per unit of time at that rice".

#### 2.2 Demand

Demand is the quantity of commodity consumers with to purchase and are able to buy at a given price over a given period of time. It may also be defined as the relationship between the various possible prices of a product and the amount of it the consumers are willing and able to buy during some period of time, other things being equal. Demand therefore goes beyond just a desire to have a certain good or service. Desire for a commodity without purchasing power or the ability to pay for, is just a want or wish and not demand. Demand backed by purchasing power and the ability to acquire a commodity at a given time is called 'effective demand'. Even in a situation where the product is not available for the consumer to buy, in so long as the means is there and the buyer is willing to purchase it, it is effective demand.

There is a relationship between the demand for a commodity and price, at any point in time; this could be shown in the form of a demand schedule, a demand function or a demand curve.

A demand function is a statement telling how each of a number of relevant variables affect the amount of product consumers will buy during some time period. For example, how many umbrellas people will buy in a given market area during a week in a rainy season, may depends on the price of umbrellas, the price of a substitute of umbrella example raincoat and the income of consumers. These variables play a role in what is called a demand function.

The law of demand states that, other things being equal, the amount of product consumers are willing and able to buy during some period varies inversely with the price of that product.

A demand schedule is a table showing the relationship between the various possible prices and the quantity purchased of that commodity over some period. Below is an individual demand schedule for mango.

Plotting price on vertical axis and quantity demanded on horizontal axis, we obtain the normal demand curve. Due to the inverse relationship between P and Qd, the normal demand curve for mango would slope downwards from left to right. A demand curve is a graphical representation of the demand schedule. A demand curve may or may not be a straight line. We however, normally use straight line demand curves for illustrative purposes.

#### 2.2.1 Market Demand

The quantity demanded of a commodity by all consumers of the commodity in the market is known as the market demand. To obtain the market demand schedule, we sum the individual demand schedules. Assuming a hypothetical economy in which we have four consumers a, b and c. The market demand schedule can be obtained as in the second table below.

The total demand in the third column gives us the market demand at the given prices. If we plot price on vertical axis and total quantity demanded on horizontal axis, we obtain a demand curve (market demand curve) that slope downwards from left to right. The inverse relationship between price and quantity demanded is also shown in the market demand schedule. That is more is bought at lower prices than at higher prices. The market demand curve slopes downward from left to right because the individual demand curves slope that way. A market demand curve for a product by definition is horizontal sum of the demand curves of the individual consumers in the market.

#### 2.3 Determinants of Demand

The demand for a commodity is influenced by the price of the commodity as well as any demand function variable that will cause a demand curve to shift. These are called the "determinants of demand".

## 2.3.1 The commodity's price

In case of almost all commodities, quantity demanded increases as the price of the commodity falls, income, taste and all other prices remaining unchanged. When the price of a commodity is high, only the rich can afford to buy it. The quantity demanded of the market is therefore low. When the price falls, however, those in the low and middle income bracket can also afford. As a result, the quantity demanded will increase.

The real income and substitution effects of price changes also influence the quantity demanded of a product. Real income is the volume or basket of goods nominal income can buy. There is an inverse relationship between real income and price. When price increases real income falls and vice versa. Real income = Nominal income

Price The substitution effect is based on the rationality of the consumer. When the price of a commodity falls, the rational consumer substitutes this commodity for a relatively expensive one. This implies when price falls more would be demanded, and when price increases less would be demanded.

## 2.3.2 Prices of related commodities

The consumer's demand for a commodity may be influenced by the prices of related goods. The related goods may be substitutes or complements.

## 2.3.2.1 Substitutes

Two commodities are substitutes if one can be used in place of the other. Substitute goods need not be consumed together. Example, Milo and bournvita; butter and margarine etc. A fall in the price of one would result in one of the other commodity being bought. This is true when considered the other way round.

#### 2.3.2.2 Complements

Complements or complementary goods are two goods that have the relationship such that having one of them increases the satisfaction received from the other. Example car and car tyres; torchlight and batteries; car and fuel and others. A fall in the price of one may result in an increase in the demand for the other. For instance a fall in the price of cars (probably due to a fall in the demand for cars) would result in fall in the demand for fuel, other things being equal. An increase in the price of cars would result in the reverse effect.

#### 2.3.3 Consumer income

The effect of changes in income on demand could be positive, neutral or negative according to the nature of the commodity in question, which is whether the commodity is a normal good, a necessity or an inferior good. For normal goods, increase in income leads to increase in demand and vice versa. An increase in income reduces demand for inferior goods and decrease in income has the opposite effect. An increase or decrease in the consumer's income has little or no effect on the demand for necessities. Salt is a good example of a necessity. A normal good is a commodity with a positive income effect, so that consumers buy more of such goods when their real income increases. An inferior good is a commodity with a negative income effect so that as consumers' real income rise, they buy less o such goods.

#### **2.3.4** Taste or preference

All things being equal, if the consumer has taste or preference for a particular commodity, more of it would be demanded. Taste or preference may be influenced by factors like fashion, weather, customs and traditions, occasions and others. For instance, there would be an increase in demand for raincoats and umbrellas in the rainy seasons.

Other factors that influence market demands in particular, are expectation of future changes in price or supply; population size; age distribution /structure; advertisement etc.

## 2.4 Main Determinants of Price Elasticity of Demand

## 2.4.1 **Determinants**

#### 2.4.1.1 Nature of commodity:

Commodities are classified as necessities, luxuries and comforts.

(i) A necessity that has no close substitute (salt, newspaper, polish etc.) will have an inelastic demand because its consumptions cannot be postponed.

Moreover, consumers purchase almost a fixed amount of a necessity per unit of time whether the price" is somewhat higher or lower.

(ii) Demand of luxuries is relatively more elastic because consumption of luxuries (TV. sets, decoration items, etc.) can be dispensed with or postponed when their prices rise.

(iii) Comforts have more elastic demand than necessities and less elastic in comparison to luxuries.

Commodities arc also classified as durable and perishable. Demand for durable goods is more elastic than perishable goods (non-durable) because when the price of former increases, people either get the old one repaired or buy a second hand.

#### 2.4.1.2 Range of substitutes:

A commodity has elastic demand if there are close substitutes of it. A small rise in the price of a commodity having close substitute will force the buyers to reduce the consumption of the commodity in favour of substitutes.

A lower price will attract the buyers' of the other substitutes to purchase the commodity. If no substitutes are available, demand for goods tends to be inelastic. Demand for salt is highly inelastic because it has no substitute.

#### 2.4.1.3 Number of uses of a commodity

Larger the number of uses of a commodity, the higher is its elasticity of demand. The demand in each single use of such commodities may be inelastic, but the demand in all uses taken together is elastic.

For example, gram is used for money purposes. If its price rises, it will not be used in less important uses and the quantity demanded will fall appreciably.

Contrary to this, the bangles for women have no other use and, therefore, their demand is relatively inelastic.

## 2.4.1.4 Possibility of postponement of purchase

If the use or purchase of a commodity can be postponed for some times, then the demand of such commodity will be elastic.

For example, if cement, bricks, wood and other building materials become costlier, people will postpone the construction of houses. Therefore, price elasticity of building materials will be high.

## 2.4.1.5 Importance of the commodity in consumer's budget

The demand for such goods is inelastic on which a small portion of income is spent, the j items like toothpaste, shoe polish, electric bulbs have inelastic demand as we spend a small portion of our income on these items.

If the prices of these items rise, the consumer budget is not affected much. On the other hand clothes and durable items take away a large portion of the income. Therefore, the demand for such commodities is elastic.

## 2.4.1.6 Range of prices

At a very high or very low range of prices, demand tends to be inelastic Demand for high priced commodities come from only the rich people who give little importance to price.

A change in the price of high-priced commodities will not generally affect the demand of rich consumers.

On the other hand low priced commodities are either necessities or a small part of income is spent an them. Therefore, their demand is inelastic.

#### 2.4.1.7 Income level

People with high incomes are less affected by price changes than people with low incomes. A rich man will not curtail his consumption of vegetables, milk, fruits even if their prices rise significantly and he will continue to purchase the same amount as before.

But a poor man cannot do so. Thus, the distribution of national income has an important bearing on the elasticity of demand

#### 2.4.1.8 Time

In the short-run the demand is inelastic while in the long-run demand is elastic. The reason is that in the long-run consumer can change their habits and consumption pattern.

## 2.4.1.9 Joint demand

Elasticity of demand for a commodity is also influenced by the elasticity of its jointly demanded commodities.

If the demand for pen is inelastic then the demand for ink will be inelastic. Generally, the elasticity of jointly demanded goods is inelastic.

#### **Review Questions**

- 1. Define the Demand in economics?
- 2. Explain the determinants of Demand?
- 3. Explain the determinants of Price Elasticity of Demand?
- 4. Explain the commodity in consumer's budget?

#### **Discussion Questions**

Discuss the Demand and its determinants?

#### Lesson 3 – Elasticity of demand

Learning Objectives

- To define the Price elasticity of demand.
- To explain the Point-price elasticity.
- To explain the Arc elasticity.
- To describe the Optimal pricing.

#### 3.1 Price elasticity of demand

**Price elasticity of demand** (**PED** or  $\mathbf{E}_d$ ) is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price. More precisely, it gives the percentage change in quantity demanded in response to a one percent change in price (ceteris paribus, i.e. holding constant all the other determinants of demand, such as income). It was devised by Alfred Marshall.

Price elasticities are almost always negative, although analysts tend to ignore the sign even though this can lead to ambiguity. Only goods which do not conform to the law of demand, such as Veblen and Giffen goods, have a positive PED. In general, the demand for a good is said to be *inelastic* (or *relatively inelastic*) when the PED is less than one (in absolute value): that is, changes in price have a relatively small effect on the quantity of the good demanded. The demand for a good is said to be *elastic* (or *relatively elastic*) when its PED is greater than one (in absolute value): that is, changes in price have a relatively a relatively elastic) when its PED is greater than one (in absolute value): that is, changes in price have a relatively large effect on the quantity of a good demanded.

Revenue is maximized when price is set so that the PED is exactly one. The PED of a good can also be used to predict the incidence (or "burden") of a tax on that good. Various research methods are used to determine price elasticity, including test markets, analysis of historical sales data and conjoint analysis.

#### **3.1.1 Definition**

It is a measure of responsiveness of the quantity of a good or service demanded to changes in its price. The formula for the coefficient of price elasticity of demand for a good is:

$$e_{\langle R \rangle} = \frac{\mathrm{d}\,Q/Q}{\mathrm{d}\,P/P}$$

The above formula usually yields a negative value, due to the inverse nature of the relationship between price and quantity demanded, as described by the "law of demand". For example, if the price increases by 5% and quantity demanded decreases by 5%, then the elasticity at the initial price and quantity =-5%/5%= -1. The only classes of goods which have a PED of greater than 0 are Veblen and Giffen goods. Because the PED is negative for the vast majority of goods and services, however, economists often refer to price elasticity of demand as a positive value (i.e., in absolute value terms).

This measure of elasticity is sometimes referred to as the *own-price* elasticity of demand for a good, i.e., the elasticity of demand with respect to the good's own price, in order to distinguish it from the elasticity of demand for that good with respect to the change in the price of some other good, i.e., a complementary or substitute good. The latter type of elasticity measure is called a *cross*-price elasticity of demand.

As the difference between the two prices or quantities increases, the accuracy of the PED given by the formula above *decreases* for a combination of two reasons. First, the PED for a good is not necessarily constant; as explained below, PED can vary at different points along the demand curve, due to its percentage nature. Elasticity is not the same thing as the slope of the demand curve, which is dependent on the units used for both price and quantity. Second, percentage changes are not symmetric; instead, the percentage change between any two values depends on which one is chosen as the starting value and which as the ending value. For example, if quantity demanded increases *from* 10 units *to* 15 units, the percentage change is 50%, i.e.,  $(15 - 10) \div 10$  (converted to a percentage). But if quantity demanded decreases *from* 15 units, the percentage change is -33.3%, i.e.,  $(10 - 15) \div 15$ .

Two alternative elasticity measures avoid or minimise these shortcomings of the basic elasticity formula: *point-price elasticity* and *arc elasticity*.

#### **3.1.2** Point-price elasticity

One way to avoid the accuracy problem described above is to minimise the difference between the starting and ending prices and quantities. This is the approach taken in the definition of *point-price* elasticity, which uses differential calculus to calculate the elasticity for an infinitesimal change in price and quantity at any given point on the demand curve:

$$E_d = \frac{P}{Q_d} \times \frac{dQ_d}{dP}$$

In other words, it is equal to the absolute value of the first derivative of quantity with respect to price  $(dQ_d/dP)$  multiplied by the point's price (P) divided by its quantity (Q<sub>d</sub>).

In terms of partial-differential calculus, point-price elasticity of demand can be defined as follows: let  $x(p,w)_{be}$  the demand of goods  $x_1, x_2, \ldots, x_{Las}$  a function of parameters price and wealth, and let  $x_l(p,w)_{be}$  the demand for good l. The elasticity of demand for good  $x_l(p,w)_{with}$  respect to price  $p_{kis}$ 

$$E_{x_l,p_k} = \frac{\partial x_l(p,w)}{\partial p_k} \cdot \frac{p_k}{x_l(p,w)} = \frac{\partial \log x_l(p,w)}{\partial \log p_k}$$

However, the point-price elasticity can be computed only if the formula for the demand function,  $Q_d = f(P)$ , is known so its derivative with respect to price,  $dQ_d/dP$ , can be determined.

#### 3.1.3 Arc elasticity

A second solution to the asymmetry problem of having a PED dependent on which of the two given points on a demand curve is chosen as the "original" point and which as the "new" one is to compute the percentage change in P and Q relative to the *average* of the two prices and the *average* of the two quantities, rather than just the change relative to one point or the other. Loosely speaking, this gives an "average" elasticity for the section of the actual demand curve—i.e., the *arc* of the curve—between the two points. As a result, this measure is known as the *arc elasticity*, in this case with respect to the price of the good. The arc elasticity is defined mathematically as:

$$E_d = \frac{\frac{P_1 + P_2}{2}}{\frac{Q_{d_1} + Q_{d_2}}{2}} \times \frac{\Delta Q_d}{\Delta P} = \frac{P_1 + P_2}{Q_{d_1} + Q_{d_2}} \times \frac{\Delta Q_d}{\Delta P}$$

This method for computing the price elasticity is also known as the "midpoints formula", because the average price and average quantity are the coordinates of the midpoint of the straight line between the two given points. However, because this formula implicitly assumes the section of the demand curve between those points is linear, the greater the curvature of the actual demand curve is over that range, the worse this approximation of its elasticity will be.

#### 3.1.3.1 History



The illustration that accompanied Marshall's original definition of PED, the ratio of PT to Pt

Together with the concept of an economic "elasticity" coefficient, Alfred Marshall is credited with defining PED ("elasticity of demand") in his book *Principles of Economics*, published in 1890. He described it thus: "And we may say generally:— the elasticity (or responsiveness) of demand in a market is great or small according as the amount demanded increases much or little for a given fall in price, and diminishes much or little for a given rise in price". He reasons this since "the only universal law as to a person's desire for a commodity is that it diminishes... but this diminution may be slow or rapid. If it is slow... a small fall in price will cause a comparatively large increase in his purchases. But if it is rapid, a small fall in price will cause only a very small increase in his purchases. In the former case... the elasticity of his demand is small." Mathematically, the Marshallian PED was based on a point-price definition, using differential calculus to calculate elasticities.

#### 3.1.3.4 Determinants

The overriding factor in determining PED is the willingness and ability of consumers after a price change to postpone immediate consumption decisions concerning the good and to search for substitutes ("wait and look"). A number of factors can thus affect the elasticity of demand for a good:

- Availability of substitute goods: the more and closer the substitutes available, the higher the elasticity is likely to be, as people can easily switch from one good to another if an even minor price change is made; There is a strong substitution effect. If no close substitutes are available the substitution of effect will be small and the demand inelastic.
  - **Breadth of definition of a good:** the broader the definition of a good (or service), the lower the elasticity. For example, Company X's fish and chips would tend to have a relatively high elasticity of demand if a significant number of substitutes are available, whereas food in general would have an extremely low elasticity of demand because no substitutes exist.
- **Percentage of income:** the higher the percentage of the consumer's income that the product's price represents, the higher the elasticity tends to be, as people will pay more attention when purchasing the good because of its cost; The income effect is substantial. When the goods represent only a negligible portion of the budget the income effect will be insignificant and demand inelastic,
- **Necessity:** the more necessary a good is, the lower the elasticity, as people will attempt to buy it no matter the price, such as the case of insulin for those that need it.
- **Duration:** for most goods, the longer a price change holds, the higher the elasticity is likely to be, as more and more consumers find they have the time and inclination to search for substitutes. When fuel prices increase suddenly, for instance, consumers may still fill up their empty tanks in the short run, but when prices remain high over several years, more consumers will reduce their demand for fuel by switching to carpooling or public transportation, investing in vehicles with greater fuel economy or taking other measures. This does not hold for consumer durables such as the cars themselves, however; eventually, it may become necessary for consumers to replace their present cars, so one would expect demand to be less elastic.
- **Brand loyalty:** an attachment to a certain brand—either out of tradition or because of proprietary barriers—can override sensitivity to price changes, resulting in demand that is more inelastic.
- Who pays: Where the purchaser does not directly pay for the good, they consume, such as with corporate expense accounts, demand is likely to be more inelastic.

## 3.1.3.2 Interpreting values of price elasticity coefficients



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Perfectly inelastic demand<sup>[10]</sup>





Perfectly elastic demand

Elasticities of demand are interpreted as follows:

Value	Descriptive Terms
$E_d = 0$	Perfectly inelastic demand
$-1 < E_d < 0$	Inelastic or relatively inelastic demand
$E_{d} = -1$	Unit elastic, unit elasticity, unitary elasticity, or unitarily elastic demand
$-\infty < E_d < -1$	Elastic or relatively elastic demand
$E_d = -\infty$	Perfectly elastic demand

A decrease in the price of a good normally results in an increase in the quantity demanded by consumers because of the law of demand, and conversely, quantity demanded decreases when price rises. As summarized in the table above, the PED for a good or service is referred to by different descriptive terms depending on whether the elasticity coefficient is greater than, equal to, or less than -1. That is, the demand for a good is called:

- relatively inelastic when the percentage change in quantity demanded is less than the percentage change in price (so that E<sub>d</sub> > 1);
- *unit elastic, unit elasticity, unitary elasticity,* or *unitarily elastic* demand when the percentage change in quantity demanded is *equal to* the percentage change in price (so that  $E_d = -1$ ); and
- *Relatively elastic* when the percentage change in quantity demanded is *greater than* the percentage change in price (so that  $E_d < -1$ ).

As the two accompanying diagrams show, *perfectly elastic* demand is represented graphically as a horizontal line, and *perfectly inelastic* demand as a vertical line. These are the *only* cases in which the PED and the slope of the demand curve  $(\Delta P / \Delta Q)$  are *both* constant, as well as the *only* cases in which the PED is determined solely by the slope of the demand curve (or more precisely, by the *inverse* of that slope).

## 3.1.3.3 Effect on total revenue



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A set of graphs shows the relationship between demand and total revenue (TR) for a linear demand curve. As price decreases in the elastic range, TR increases, but in the inelastic range, TR decreases. TR is maximised at the quantity where PED = 1.

A firm considering a price change must know what effect the change in price will have on total revenue. Revenue is simply the product of unit price times quantity:

Revenue =  $PQ_d$ 

Generally any change in price will have two effects:

- the *price effect* : For inelastic goods, an increase in unit price will tend to increase revenue, while a decrease in price will tend to decrease revenue. (The effect is reversed for elastic goods.)
- the *quantity effect* : an increase in unit price will tend to lead to fewer units sold, while a decrease in unit price will tend to lead to more units sold.

For inelastic goods, because of the inverse nature of the relationship between price and quantity demanded (i.e., the law of demand), the two effects affect total revenue in opposite directions. But in determining whether to increase or decrease prices, a firm needs to know what the net effect will be. Elasticity provides the answer: The percentage change in total revenue is approximately equal to the

percentage change in quantity demanded plus the percentage change in price. (One change will be positive, the other negative.) The percentage change in quantity is related to the percentage change in price by elasticity: hence the percentage change in revenue can be calculated by knowing the elasticity and the percentage change in price alone.

As a result, the relationship between PED and total revenue can be described for any good:

- When the price elasticity of demand for a good is *perfectly inelastic* ( $E_d = 0$ ), changes in the price do not affect the quantity demanded for the good; raising prices will always cause total revenue to increase. Goods necessary to survival can be classified here; a rational person will be willing to pay anything for a good if the alternative is death. For example, a person in the desert weak and dying of thirst would easily give all the money in his wallet, no matter how much, for a bottle of water if he would otherwise die. His demand is not contingent on the price.
- When the price elasticity of demand for a good is *relatively inelastic* ( $-1 < E_d < 0$ ), the percentage change in quantity demanded is smaller than that in price. Hence, when the price is raised, the total revenue rises, and vice versa.
- When the price elasticity of demand for a good is *unit (or unitary) elastic* ( $E_d = -1$ ), the percentage change in quantity is equal to that in price, so a change in price will not affect total revenue.
- When the price elasticity of demand for a good is *relatively elastic* ( $-\infty < E_d < -1$ ), the percentage change in quantity demanded is greater than that in price. Hence, when the price is raised, the total revenue falls, and vice versa.
- When the price elasticity of demand for a good is *perfectly elastic* ( $E_d is \infty$ ), any increase in the price, no matter how small, will cause demand for the good to drop to zero. Hence, when the price is raised, the total revenue falls to zero. This situation is typical for goods that have their value defined by law (such as fiat currency); if a 5 dollar bill were sold for anything more than 5 dollars, nobody would buy it, so demand is zero.

Hence, as the accompanying diagram shows, total revenue is maximized at the combination of price and quantity demanded where the elasticity of demand is unitary.

It is important to realize that price-elasticity of demand is *not* necessarily constant over all price ranges. The linear demand curve in the accompanying diagram illustrates that changes in price also change the elasticity: the price elasticity is different at every point on the curve.

#### 3.1.3.4 Effect on tax incidence



#### 5

When demand is more inelastic than supply, consumers will bear a greater proportion of the tax burden than producers will.

PEDs, in combination with price elasticity of supply (PES), can be used to assess where the incidence (or "burden") of a per-unit tax is falling or to predict where it will fall if the tax is imposed. For example, when demand is *perfectly inelastic*, by definition consumers have no alternative to purchasing the good or service if the price increases, so the quantity demanded would remain constant. Hence, suppliers can increase the price by the full amount of the tax, and the consumer would end up paying the entirety. In the opposite case, when demand is *perfectly elastic*, by definition consumers have an infinite ability to switch to alternatives if the price increases, so they would stop buying the good or service in question completely—quantity demanded would fall to zero. As a result, firms cannot pass on any part of the tax by raising prices, so they would be forced to pay all of it themselves.

In practice, demand is likely to be only *relatively* elastic or relatively inelastic, that is, somewhere between the extreme cases of perfect elasticity or inelasticity. More generally, then, the *higher* the elasticity of demand compared to PES, the heavier the burden on producers; conversely, the more *inelastic* the demand compared to PES, the heavier the burden on consumers. The general principle is that the party (i.e., consumers or producers) that has *fewer* opportunities to avoid the tax by switching to alternatives will bear the *greater* proportion of the tax burden. In the end individual households carry the whole tax burden since they are the ultimate owners of the means of production that the firm utilises.

#### 3.1.3.5 Optimal pricing

Among the most common applications of price elasticity is to determine prices that maximize revenue or profit.

## Constant elasticity and optimal pricing

If one point elasticity is used to model demand changes over a finite range of prices, elasticity is implicitly assumed constant with respect to price over the finite price range. The equation defining price elasticity for one product can be rewritten (omitting secondary variables) as a linear equation.

$$LQ = K + E \times LP$$

where

$$LQ = ln(Q), LP = ln(P), E_{is the elasticity, and K is a constant.$$

Similarly, the equations for cross elasticity for n products can be written as a set of n simultaneous linear equations.

$$LQ_l = K_l + E_{l,k} \times LP^k$$

where

$$l_{\text{and}} k = 1...n, LQ_l = ln(Q_l), LP^l = ln(P^l)$$
, and  $K_{l\text{are constants}}$ ; and appearance of a letter index as both an upper index and a lower index in the same term implies summation over that index.

This form of the equations shows that point elasticities assumed constant over a price range cannot determine what prices generate maximum values of ln(Q); similarly they cannot predict prices that generate maximum Q or maximum revenue.

Constant elasticities can predict optimal pricing only by computing point elasticities at several points, to determine the price at which point elasticity equals -1 (or, for multiple products, the set of prices at which the point elasticity matrix is the negative identity matrix).

#### 3.1.3.6 Non-constant elasticity and optimal pricing

If the definition of price elasticity is extended to yield a quadratic relationship between demand units (Q) and price, then it is possible to compute prices that maximize ln(Q), Q, and revenue. The fundamental equation for one product becomes

$$LQ = K + E_1 \times LP + E_2 \times LP^2$$

and the corresponding equation for several products becomes

$$LQ_l = K_l + E1_{l,k} \times LP^k + E2_{l,k} \times (LP^k)^2$$

Excel models are available that compute constant elasticity, and use non-constant elasticity to estimate prices that optimize revenue or profit for one product or several products.

## 3.1.3.7 Limitations of revenue-maximizing and profit-maximizing pricing strategies

In most situations, revenue-maximizing prices are not profit-maximizing prices. For example, if variable costs per unit are nonzero (which they usually are), then a more complex computation of a similar kind yields prices that generate optimal profits.

In some situations, profit-maximizing prices are not an optimal strategy. For example, where scale economies are large (as they often are), capturing market share may be the key to long-term dominance of a market, so maximizing revenue or profit may not be the optimal strategy.

## **Review Questions**

- 1. Define the Price elasticity of demand?
- 2. Explain the Point-price elasticity?
- 3. Explain the Arc elasticity?
- 4. Explain the Optimal pricing?

## **Discussion Questions**

Discuss the Elasticity of demand?

#### Lesson 4 - Cost concept and Cost analysis

#### Learning Objectives

- To define the Cost concept.
- To explain the Cost analysis.
- To explain the Quadrants of Cost-Effectiveness.
- To describe the key Attributes of Cost Analyses.

#### **4.1 Cost Concepts**

#### 4.1.1 Opportunity Cost

The resources of any firm operating in the market are limited and investment options are many. The firm therefore has to decide or select only those investment opportunities/options which provide the firm with the best return or best income on investment. This means that if a firm can invest money/ resources only in one investment option then the firm will select that investment option which promises best return on investment to the firm. In other words while doing so the firm gives up/rejects the next best option for investing the funds. The opportunity cost of a company is thus this income/ return which the firm could have earned on the next best investment alternative.

This can also be understood by a simple example - Let us assume that an individual has two job offers in hand. One job offer is promising him a salary of Rs. 30, 000 per month while the other job offer will ensure salary of Rs. 25, 000 per month. If the job profile and other factors related to the job offers are more or less same then it can be easily expected that the individual will select the job offer, which will provide him with higher salary that is salary of Rs. 30, 000 per month. Thus, in this case, the opportunity cost is the return involved in the next best alternative i.e; Salary of Rs. 25, 000 in the next best job offer.

Concept of opportunity cost is closely related to the concept of **Economic profit or Economic Rent**. A firm earns or makes Economic profit only when besides covering various costs of operation, a firm is also able to earn more than its opportunity cost (or its possible earnings under the next best investment alternative). Opportunity Cost is also termed as **Implicit Cost**.

#### Economic Profit is thus earned only when following is true for the Firm:

#### Income of a Firm > Various Costs of Operations + Opportunity Cost

OR *Economic Profit = Earnings or Revenue of Firm - Economic Costs*. Here Economic Cost is various expenses of the business plus the opportunity cost

## 4.1.2 Money Cost and Real Cost

**Money Cost** of production is the actual monetary expenditure made by company in the production process. Money cost thus includes all the business expenses which involve outlay of money to support business operations. For example the monetary expenditure on purchase of raw material, payment of wages and salaries, payment of rent and other charges of business etc can be termed as Money Cost.

**Real Cost** of production or business operation on the other hand includes all such expenses/costs of business which may or may not involve actual monetary expenditure. For example if owner of a business venture uses his personal land and building for running the business venture and he/she does not charge any rent for the same then such head will not be considered/included while computing the Money Cost but this head will be part of Real Cost computation. Here the cost involved is the Opportunity Cost of the land and building. If the promoter of the company had not used the land and building for the business venture then the land and building could have been used elsewhere for some other enture and could have generated some income for the promoter. This income/rent which could have been earned under the next best investment option is the opportunity cost which needs to be considered while calculating the Real Cost for the firm.

## 4.1.3 Accounting Cost and Economic Cost

Accounting Cost includes all such business expenses that are recorded in the book of accounts of a business firm as acceptable business expenses. Such expenses include expenses like Cost of Raw Material, Wages and Salaries, Various Direct and Indirect business Overheads, Depreciation, Taxes etc. When such business expenses or accounting expenses are deducted from the Sales income of any firm the accounting profit is obtained. Such Accounting/Business expenses or costs are also termed as **Explicit Costs**.

- Accounting Cost: Various allowed business expenses. Such as Cost of Raw Material, Salaries and Wages, Electricity Bill, Telephone Charges, Various Administrative Expenses, Selling and Distribution Expenses, Production Overhead Expenses, Other Indirect Overhead Expenses etc.
- Accounting Profit = Sales Income Accounting Cost

**Economic Cost** on the other hand includes all the accounting expenses as well as the Opportunity cost of a business firm. Economic Cost and Economic Profit is thus calculated as follows:

- Economic Cost = Accounting Cost (Explicit Costs) + Opportunity Cost
- Economic Profit = Total Revenues (Accounting Cost + Opportunity Cost)

#### 4.1.4 Private Cost and Social Cost

The actual expenses of individuals/ firms which are borne or paid out by the individual or a firm can be termed as **Private Cost**. Thus for a business firm this may include expenses like Cost of Raw Material, Salaries and Wages, Rent, Various Overhead Expenses etc.

On the other hand Private Cost for an individual will be his or her private expenses such as expense on food, rent of house, expenses on clothing, expenses on travel, expenses on entertainment etc.

**Social Cost** on the other hand includes Private Cost and also such costs which are not borne by the firm but by the society at large. For example the cost of damage or disutility caused by the operations of a firm in an economy may not be borne by the firm in question but it impacts the society at large and thus such cost is added to the Private Cost to find the Social Cost of producing the product. Such Cost (that is cost not borne or paid out by the firm) is also known as **External Cost**. Another example of external cost can be the cost of providing the basic infrastructure facilities like good roads, sewage system or network, street lights etc. Cost of such facilities is not borne by a business firm even though the firm is benefits from such facilities. Such costs (External Costs) are thus added to the Private Cost to find the Social Cost of producing a product or good.

Above can be understood by following example: If a Tannery firm (A firm processing animal skins) releases its toxic wastes in the river flowing nearby its factory premises then this act of the Tannery firm results in water pollution and environmental damage. The Cost of such damage/loss (also known as External Cost) is added to the private costs of the tannery firm to get fair idea of Social cost involved in the production of the product in question.

Social Cost of an individual will include his private cost and the cost of damage on account of his actions (that has resulted in doing harm/damage to the environment/society at large).

## 4.1.5 Fixed Cost, Variable Cost, Average Cost and Marginal Cost

*Fixed Cost* is that cost which does not change (that is either goes up or goes down) irrespective of whether the firm is operating or not. For example on account of Strike on account of Lockout in Maruti-Suzuki's Manesar plant the production process stands still. Even when the plant is not operating the Firm still has to bear such expenses which are indirect in nature. For Example Rent of the factory premises, Wages of administrative employees etc. In other Fixed cost is not related direct production/manufacturing expenses.

*Variable Cost* on the Other hand is directly proportional to the production operations. As the size of production at any business grows, along with that grow the variable expenses. As the name suggests, the variable expenses vary with the business operations. When the firm is not operating on account of Strike/Lockout etc, then the variable cost of the firm is Zero

Average Cost is the cost that is obtained after dividing Total Cost with the number of units produced.

- Total Cost = Fixed Cost + Variable Cost
- Average Cost = Total Cost / Units of Good produced

*Marginal Cost* is the change in the Total cost when an additional unit of good is produced. In other words Marginal Cost is difference between total Cost of producing N + 1 units of good and N units of good.

• Marginal Cost = TC (n+1) - TC(n)

Following table can help in understanding the cost concepts like Total Cost (TC), Average Cost (AC), Marginal Cost (MC) etc

Understanding Fixed, Variable, Total, Average and Marginal Cost					
Number of Units Produced	Fixed Cost	Variable Cost	Total Cost	Average Cost	Marginal Cost
1	10	5	15	15	15
2	10	10	20	10	5
3	10	17	27	9	7
4	10	30	40	10	13
5	10	45	55	11	15

In the above table, it is clearly visible that Fixed cost (which is 10) remains same irrespective of the number of units of the good being produced. On the other hand the Variable Cost is increasing as the number of units of good being produced is increasing. Thus, Variable Cost is going up from 5 to 10 and from 10 to 17 etc as the number of units of good being produced is increasing. Again it can be seen from the above table that Total Cost is the sum total of Fixed Cost and Variable Cost. Thus Total Cost is 15 for the first unit (where 10 is Fixed Cost and 5 is Variable Cost). Again for producing 2 units, the Total Cost is 20 (where 10 is Fixed Cost and remaining 10 is the Variable Cost). Above Table also clearly indicates that the Average Cost is being obtained by dividing Total Cost with the number of units of good being produced. Thus for the first unit of good being produced it is 15. This value has been obtained by dividing Total Cost (15) with the number of units of good produced (1). Similarly, the Average Cost of producing two units is 10, which is obtained by dividing Total Cost (20) with number of units produced (2). On the other hand Marginal Cost is the change in the total cost when an additional unit of good is being produced. Thus for the first unit of good being produced, it is 15. This value is obtained by deducting from the Total Cost of producing 'One' unit of good (15) the Total Cost of producing 'Zero' units of good. For producing the second unit, the marginal cost is 5. This is obtained by deducting from the Total Cost of producing 'two' units of good (20) the Total Cost of producing 'one' unit of good (15)

Studies of costs and related economic implications comprise a major group of methods used in HTA. These studies can involve attributes of either or both of primary data collection and integrative methods. That is, cost data can be collected as part of RCTs and other clinical studies, as well as administrative databases used in health care payment. Cost data from one or more such sources often are combined with

data from primary clinical studies, epidemiological studies, and other sources to conduct costeffectiveness analyses and other cost studies that involve weighing health and economic impacts of health technology.

Interest in cost analyses has accompanied concerns about rising health care costs, pressures on health care policymakers to allocate resources, and the need for health product makers and other technology advocates to demonstrate the economic benefits of their technologies. This interest is reflected in a considerable increase in the number of reports of cost analyses in the literature and further refinement of methods.

# 4.2 Main Types of Cost Analysis

There is a variety of approaches to cost analysis, the suitability of any of which depends upon the purpose of an assessment and the availability of data and other resources. It is rarely possible or necessary to identify and quantify all costs and all benefits (or outcomes), and the units used to quantify these may differ.

Main types of cost analysis include the following.

- *Cost-of-illness analysis:* a determination of the economic impact of an illness or condition (typically on a given population, region, or country) e.g., of smoking, arthritis or bedsores, including associated treatment costs
- *Cost-minimization analysis:* a determination of the least costly among alternative interventions that are assumed to produce equivalent outcomes
- *Cost-effectiveness analysis (CEA):* a comparison of costs in monetary units with outcomes in quantitative non-monetary units, e.g., reduced mortality or morbidity
- *Cost-utility analysis (CUA):* a form of cost-effectiveness analysis that compares costs in monetary units with outcomes in terms of their utility, usually to the patient, measured, e.g., in QALYs
- *Cost-consequence analysis:* a form of cost-effectiveness analysis that presents costs and outcomes in discrete categories, without aggregating or weighting them
- *Cost-benefit analysis (CBA):* compares costs and benefits, both of which are quantified in common monetary units.

Box in below contrasts the valuation of costs and outcomes among these alternative economic analyses.

## 4.2.1 Different Types of Economic Analysis

	Valuation of		Valuation of outcomes
	costs		
Cost of Illness	\$	vs.	None
Cost Minimization	\$	vs.	Assume same
Cost Effectiveness	\$	÷	Natural units
Cost Utility	\$	÷	Utiles (e.g., QALYs)
Cost Benefit	\$	÷ or -	\$

Cost-minimization analysis, CEA and CUA necessarily involve comparisons of alternative interventions. A technology cannot be simply cost effective, though it may be cost effective compared to something else. Although CBA typically involves comparisons of alternative technologies, this is not necessary.

Because it measures costs and outcomes in monetary (not disease-specific) terms, CBA enables comparison of disparate technologies, e.g., coronary artery bypass graft surgery and screening for breast cancer. A drawback of CBA is the difficulty of assigning monetary values to all pertinent outcomes, including changes in the length or quality of human life. CEA avoids this limitation by using more direct or natural units of outcomes such as lives saved or strokes averted. As such, CEA can only compare technologies whose outcomes are measured in the same units. In CUA, estimates of utility are assigned to health outcomes, enabling comparisons of disparate technologies.

Two basic approaches for cost-benefit analysis (CBA) are ratio approach and the net benefit approach. The ratio approach indicates the amount of benefits (or outcomes) that can be realized per unit expenditure on a technology vs. a comparator. In the ratio approach, a technology is cost beneficial vs. a comparator if the ratio of the change in costs to the change in benefits is less than one. The net benefits approach indicates the absolute amount of money saved or lost due to a use of a technology vs. a comparator. In the net benefits formulation, a technology is cost-beneficial vs. a comparator if the net change in benefits formulation, a technology is cost-beneficial vs. a comparator if the net change in benefits exceeds the net change in costs. The choice between a net benefits approach or a benefit/cost approach for a CBA can affect findings. The approach selected may depend upon such factors as whether costs must be limited to a certain level, whether the intent is to maximize the absolute level of costs, etc. Indeed, under certain circumstances these two basic approaches may yield different preferences among alternative technologies.

Box in below shows basic formulas for determining CEA, CUA, and CBA.

**Basic Formulas for CEA, CUA, and CBA** 

Int: Intervention; Comp: Comparator

# **Cost-Effectiveness Ratio:**

 $CE Ratio = \frac{\$Cost_{Int} - \$Cost_{Comp}}{\$Effect_{Int} - \$Effect_{Comp}}$ 

For example: "\$45,000 per life-year saved" or "\$10,000 per lung cancer case averted"

# **Cost-Utility Ratio:**

 $CU Ratio = \frac{\$Cost_{Int} - \$Cost_{Comp}}{\$Utile_{Int} - \$Utile_{Comp}}$ 

Utiles, units of utility or preference, are often measured in QALYs. So, for example: "\$45,000 per life-year saved" or "\$10,000 per lung cancer case averted"

# **Cost-Benefit**, Ratio Approach:

 $CE Ratio = \frac{\$Cost_{Int} - \$Cost_{Comp}}{\$Benefit_{Int} - \$Benefit_{Comp}}$ 

For example: "Cost-benefit ratio of 1.5"

## **Cost-Benefit, Net Benefit Approach:**

CB Net =  $(Cost_{Int} - Cost_{Comp}) - (Senefit_{Int} - Senefit_{Comp})$ 

For example: "Net cost of \$5,000."

## 4.2.2 Quadrants of Cost-Effectiveness

A basic approach to portraying a cost-effectiveness (or cost-utility) comparison of a new intervention to a standard of care is to consider the cost and effectiveness of a new intervention in the space of four fields., starting with the upper figure. The level of costs and the level of effectiveness for the standard of care are indicated by the "X" in the middle of the figure. A new intervention may have higher or lower costs, and higher or lower effectiveness, such that its plot may fall into one of the four quadrants surrounding the

costs and effectiveness of the standard of care. If it is known that the plot of the new intervention falls into either of two of the quadrants, i.e., where the new intervention has higher costs and lower effectiveness (indicating that it should be rejected), or it has lower costs and higher effectiveness (indicating that it should be adopted), then no further analysis may be required. If it is known that the plot of the new intervention falls into either of the other two quadrants, i.e., where the new intervention has higher costs and higher effectiveness, or it has lower costs and lower effectiveness, then further analysis weighing the marginal costs and effectiveness of the new intervention compared to the standard of care may be required.

Within either of the two quadrants that entail weighing tradeoffs of costs and effectiveness, it may be apparent that the marginal tradeoff of costs and outcomes is so high or low as to suggest rejection or adoption. This arises when the new intervention yields only very low marginal gain in effectiveness at a very high marginal cost (reject), or yields very high marginal improvements in effectiveness at a very low marginal cost (adopt).

## 4.2.3 Key Attributes of Cost Analyses

The approaches to accounting for costs and outcomes in cost analyses can vary in a number of important respects, some of which are addressed briefly below. These should be carefully considered by assessors, as well as the policymakers who intend to make use of assessment findings. Given the different ways in which costs and outcomes may be determined, all studies should make clear their methodology in these respects.

## 4.2.3.1 Comparator

Any cost analysis of one intervention versus another must be specific about the comparator. This may be standard of care (current best practice), minimum practice, or no intervention. Some analyses that declare the superiority of a new intervention may have used a comparator that is no longer in practice or is considered sub-standard care or that is not appropriate for the patient population of interest.

#### 4.2.3.2 Perspective

The perspective of a cost analysis refers to the standpoint at which costs and outcomes (or consequences or benefits) are realized. For instance, the perspective of an analysis may be that of society overall, a third-party payer, a physician, a hospital, or a patient. Clearly, costs and outcomes are not realized in the same way from each of these perspectives. Many analysts favor using the broad perspective of society and identifying all costs and all outcomes accordingly. However, "society" as such may not be the decisionmaker, and what is cost effective from that perspective may not be what is cost effective from the standpoint of a ministry of health, third-party payer, hospital manager, patient, or other decisionmaker. It is possible that this perspective may resemble that of a national or regional government, if indeed that government experiences (or is responsible for representing the perspectives of those that experience) all of the costs and outcomes that are included in a societal perspective.

Box Quadrants of Cost-Effectiveness


## 4.2.3.3 Direct Costs

Depending upon the perspective taken, cost analyses should identify two types of **direct costs**. Direct costs represent the value of all goods, services, and other resources consumed in providing health care or

dealing with side effects or other current and future consequences of health care. Two types of direct costs are direct health care costs and direct non-health care costs.

Direct health care costs include costs of physician services, hospital services, drugs, etc. involved in delivery of health care. Direct non-health care costs are incurred in connection with health care, such as for care provided by family members and transportation to and from the site of care. In quantifying direct health care costs, many analyses use readily available hospital or physician *charges* (i.e., price lists) rather than true *costs*, whose determination may require special analyses of resource consumption. However, charges (as well as actual payments) tend to reflect provider cost shifting and other factors that decrease the validity of using charges to represent the true costs of providing care.

# 4.2.3.4 Indirect Costs

Analyses should account for **indirect costs**, sometimes known as "productivity losses." These include the costs of lost work due to absenteeism or early retirement, impaired productivity at work, and lost or impaired leisure activity. Indirect costs also include the costs of premature mortality. **Intangible costs** of pain, suffering, and grief are real, yet very difficult to measure and are often omitted from cost analyses.

## 4.2.3.5 Time Horizon

Interpretation of cost analyses must consider that the time horizon (or time-frame) of a study is likely to affect the findings regarding the relative magnitudes of costs and outcomes of a health care intervention. Costs and outcomes usually do not accrue in steady streams over time. Comparisons of costs and outcomes after one year may yield much different findings than comparisons made after 5, 10, or 25 years. The meaningful time horizons for assessing the cost horizons of each of emergency appendectomies, cholesterol-lowering in high-risk adults, and smoking cessation in teenagers are likely to be quite different. For example, an analysis conducted for the Medicare program in the US to determine cost and time tradeoffs of hemodialysis and kidney transplantation showed that the annualized expenditure by the Medicare End-Stage Renal Disease Program for a dialysis patient was \$32,000. Although patients with functioning transplanted kidneys required a first-year expenditure of \$56,000, they cost Medicare only an average of \$6,400 in succeeding years. On average, estimated cumulative dialysis and transplantation costs reach a break-even point in about three years, after which transplantation provides a net financial gain compared to dialysis (Rettig 1991).

Time horizons should be long enough to capture streams of health and economic outcomes (including significant intended and unintended ones). These could encompass a disease episode, patient life, or even multiple generations of life (such as for interventions in women of child-bearing age or interventions that may cause heritable genetic changes). Quantitative modeling approaches may be needed to estimate costs and outcomes that are beyond those of available data. Of course, the higher the discount rate used in an analysis, the less important are future outcomes and costs.

#### 4.2.3.6 Average Costs vs. Marginal Costs

Assessments should make clear whether *average costs* or **marginal costs** are being used in the analysis. Whereas average cost analysis considers the total (or absolute) costs and outcomes of an intervention, marginal cost analysis considers how outcomes change with changes in costs (e.g., relative to a comparator), which may provide more information about how to use resources efficiently. Marginal cost analysis may reveal that, beyond a certain level of spending, the

additional benefits are no longer worth the additional costs. For example, as shown in **Box 21**, the average cost per desired outcome of an iterative screening test may appear to be quite acceptable (e.g.,\$2,451 per case of colorectal cancer detected assuming a total of six tests per person), whereas marginal cost analysis demonstrates that the cost of adding the last test (i.e., the additional cost of the sixth test per person) to detect another case of cancer would be astronomical.

#### Box

#### Average Cost Analysis vs. Marginal Cost Analysis

The importance of determining marginal costs is apparent in the analysis by Neuhauser and Lewicki of a proposed protocol of sequential stool guaiac testing for colon cancer. Here, average cost figures obscure a steep rise in marginal costs of testing because the high detection rate from the initial tests is averaged over subsequent tests that contribute little to the detection rate. This type of analysis helps to demonstrate how it is possible to spend steeply increasing health care resources for diminishing returns in health benefits.

#### Cancer screening and detection costs with sequential guaiac tests

No. of tests	No. of cancers detected	Additional cancers detected	ionalTotal cost (\$) ofAdditionalAveragecersdiagnosis(\$) cost of(\$)cteddiagnosisper can detect		Average cost (\$) per cancer detected	Marginal cost (\$) per cancer detected
1	65.9469	65.9469	77,511	77,511	1,175	1,175
2	71.4424	5.4956	107,690	30,179	1,507	5,492
3	71.9004	0.4580	130,199	22,509	1,810	49,150
4	71.9385	0.0382	148,116	17,917	2,059	469,534
5	71.9417	0.0032	163,141	15,024	2,268	4,724,695
6	71.9420	0.0003	176,331	13,190	2,451	47,107,214

This analysis assumed that there were 72 true cancer cases per 10,000 population. The testing protocol provided six stool guaiac tests per person to detect colon cancer. If any one of the six tests was positive, a barium-enema test was performed, which was assumed to yield no false positive and no false-negative results. Other assumptions: the true-positive cancer detection rate of any single guaiac test was 91.667%; the false-positive rate of any single guaiac test was 36.508%; the cost of the first stool guaiac test was \$4 and each subsequent guaiac test was \$1; the cost of a barium-enema was \$100. The marginal cost per case detected depends on the population screened and the sensitivity of the test used.

#### 4.2.3.7 Discounting

Cost analyses should account for the effect of the passage of time on the value of costs and outcomes. Costs and outcomes that occur in the future usually have less present value than costs and outcomes realized today. Discounting reflects the time preference for benefits earlier rather than later; it also reflects the opportunity costs of capital, i.e., whatever returns on investment that could have been gained if resources had been invested elsewhere. Thus, costs and outcomes should be *discounted* relative to their present value (e.g., at a rate of five percent per year).

Discounting allows comparisons involving costs and benefits that flow differently over time. It is less relevant for "pay as you go" benefits, such as if all costs and benefits are realized together within one year. It is more relevant in instances where these do not occur in parallel, such as when most costs are realized early and most benefits are realized in later years. Discount rates used in cost analyses are typically based on interest rates of government bonds or the market interest rates for the cost of capital whose maturity is about the same as the duration of the effective time horizon of the health care intervention of program being evaluated.

Cost analyses should also correct for the effects of *inflation* (which is different from the time preference accounted for by discounting), such as when costs or cost-effectiveness for one year are compared to another year.

## 4.2.3.8 Sensitivity Analysis

Any estimate of costs, outcomes, and other variables used in a cost analysis is subject to some uncertainty. Therefore, **sensitivity analysis** should be performed to determine if plausible variations in the estimates of certain variables thought to be subject to significant uncertainty affect the results of the cost analysis. A sensitivity analysis may reveal, for example, that including indirect costs, or assuming the use of generic as opposed to brand name drugs in a medical therapy, or using a plausible higher discount rate in an analysis changes the cost-effectiveness of one intervention compared to another.

#### 4.2.3.9 Collecting Cost Data Alongside Clinical Studies

The validity of a cost-related study depends upon the sources of the data for costs and outcomes. Increased attention is being given to collection of cost data in more rigorous, prospective studies, particularly RCTs. The closer integration of economic and clinical studies raises important methodological issues. In order to promote more rational diffusion of new technologies, it would be desirable to generate reliable cost and outcomes data during the early part of a technology's lifecycle, such as during RCTs required prior to marketing approval. An RCT would be expected to yield the most reliable data concerning efficacy of an intervention; however, the care given in an RCT and the costs of providing it may be atypical compared to more general settings. For example, RCTs may involve more extensive and frequent laboratory tests and other patient monitoring, and may occur more often in academic medical centers whose costs tend to be higher than in community health care institutions. Other aspects of trial design, sample size, choice of outcome measures, identification and tabulation of costs, burden on investigators of data collection and related matters affect the usefulness of clinical trial data for meaningful economic studies. Also, the growth of multinational clinical trials of drugs and other technologies raises challenges of estimating country-specific treatment effects and cost-effectiveness, given differences in epidemiological factors, health care delivery models, resource use, and other factors.

# **4.2.3.10** Discount Rate Calculation and Use in Determining Present Value of Future Costs and Benefits

Discount rate calculation: compiling the discounted stream of costs (or benefits) over time

$$P = \sum_{n=1}^{n} \frac{Fn}{(1+r)^n}$$

P = present value F = future cost (or benefits) at year n r = annual discount rate

Present value (P) of future cost (F) occurring at year n at selected annual discount rate (r)

		Discount Ra	te
Year	3%	5%	10%
1	0.97	0.95	0.91
5	0.86	0.78	0.62
25	0.48	0.30	0.09
50	0.23	0.09	0.009

For example, the present value of a cost (or benefit) of \$1,000 occurring:

- 1 year in the future, using 10% discount rate, is \$910
- 5 years in the future, using 3% discount rate, is \$860
- 50 yrs in the future, using 5% discount rate, is \$90

In practice, there is wide variation in economic study methodologies. Although some variation is unavoidable, many differences in perspective, accounting for direct and indirect costs, time frames, discounting and other aspects are often arbitrary, result from lack of expertise, and may reflect biases on the part of investigators or sponsors. This diminishes comparability and transferability of study results as well as credibility of findings. National and international groups have developed and revised voluntary standards for conducting and reporting economic studies of health care technologies. A recent review of 25 guidelines from North America, Europe, and Australia found a general trend toward harmonization in most methodological aspects, although there were more differences in such dimensions as choice of economic perspective, resources, and costs to be included in analysis.

#### 4.2.4 Cost-benefit analysis

**Cost benefit analysis** (CBA), sometimes called **benefit–cost analysis** (BCA), is a systematic process for calculating and comparing benefits and costs of a project, decision or government policy (hereafter, "project"). CBA has two purposes:

1. To determine if it is a sound investment/decision (justification/feasibility),

2. To provide a basis for comparing projects. It involves comparing the total expected cost of each option against the total expected benefits, to see whether the benefits outweigh the costs, and by how much.

CBA is related to, but distinct from cost-effectiveness analysis. In CBA, benefits and costs are expressed in monetary terms, and are adjusted for the time value of money, so that all flows of benefits and flows of project costs over time (which tend to occur at different points in time) are expressed on a common basis in terms of their "net present value."

Closely related, but slightly different, formal techniques include cost-effectiveness analysis, cost-utility analysis, economic impact analysis, fiscal impact analysis and Social return on investment (SROI) analysis.

# 4.2.4.1 Theory

Cost-benefit analysis is often used by governments and other organizations, such as private sector businesses, to evaluate the desirability of a given policy. It is an analysis of the expected balance of benefits and costs, including an account of foregone alternatives and the *status quo*. CBA helps predict whether the benefits of a policy outweigh its costs, and by how much relative to other alternatives (i.e. one can rank alternate policies in terms of the cost-benefit ratio). Generally, accurate cost-benefit analysis identifies choices that increase welfare from a utilitarian perspective. Assuming an accurate CBA, changing the status quo by implementing the alternative with the lowest cost-benefit ratio can improve Pareto efficiency. An analyst using CBA should recognize that perfect evaluation of all present and future costs and benefits is difficult, and while CBA can offer a well-educated estimate of the best alternative, perfection in terms of economic efficiency and social welfare are not guaranteed.

#### 4.2.4.2Process

The following is a list of steps that comprise a generic cost-benefit analysis.

- 1. List alternative projects/programs.
- 2. List stakeholders.
- 3. Select measurement(s) and measure all cost/benefit elements.
- 4. Predict outcome of cost and benefits over relevant time period.
- 5. Convert all costs and benefits into a common currency.
- 6. Apply discount rate.
- 7. Calculate net present value of project options.
- 8. Perform sensitivity analysis.
- 9. Adopt recommended choice.

#### 4.2.4.3 Valuation

CBA attempts to measure the positive or negative consequences of a project, which may include:

- 1. Effects on users or participants
- 2. Effects on non-users or non-participants
- 3. Externality effects
- 4. Option value or other social benefits.

A similar breakdown is employed in environmental analysis of total economic value. Both costs and benefits can be diverse. Financial costs tend to be most thoroughly represented in cost-benefit analyses due to relatively abundant market data. The net benefits of a project may incorporate cost savings or public willingness to pay compensation (implying the public has no legal right to the benefits of the policy) or willingness to accept compensation (implying the public has a right to the benefits of the policy) for the welfare change resulting from the policy. The guiding principle of evaluating benefits is to list all (categories of) parties affected by an intervention and add the (positive or negative) value, usually monetary, that they ascribe to its effect on their welfare.

The actual compensation an individual would require to have their welfare unchanged by a policy is inexact at best. Surveys (stated preference techniques) or market behavior (revealed preference techniques) are often used to estimate the compensation associated with a policy; however, survey respondents often have strong incentives to misreport their true preferences and market behavior does not provide any information about important non-market welfare impacts.

One controversy is valuing a human life, e.g. when assessing road safety measures or life-saving medicines. However, this can sometimes be avoided by using the related technique of cost-utility analysis, in which benefits are expressed in non-monetary units such as quality-adjusted life years. For example, road safety can be measured in terms of *cost per life saved*, without formally placing a financial value on the life. However, such non-monetary metrics have limited usefulness for evaluating policies with substantially different outcomes. Additionally, many other benefits may accrue from the policy, and metrics such as 'cost per life saved' may lead to a substantially different ranking of alternatives than traditional cost-benefit analysis.

Another controversy is valuing the environment, which in the 21st century is typically assessed by valuing ecosystem services to humans, such as air and water quality and pollution. Monetary values may also be assigned to other intangible effects such as business reputation, market penetration, or long-term enterprise strategy alignment.

#### 4.2.4.4 Time and Discounting

CBA usually tries to put all relevant costs and benefits on a common temporal footing using time value of money calculations. This is often done by converting the future expected streams of costs and benefits into a present value amount using a discount rate. Empirical studies and a technical framework suggest that in reality, people do discount the future like this.

The choice of discount rate is subjective. A smaller rate values future generations equally with the current generation. Larger rates (e.g. a market rate of return) reflects humans' attraction to time inconsistency— valuing money that they receive today more than money they get in the future. The choice makes a large difference in assessing interventions with long-term effects, such as those affecting climate change. One issue is the equity premium puzzle, in which long-term returns on equities may be rather higher than they should be. If so then arguably market rates of return should not be used to determine a discount rate, as doing so would have the effect of undervaluing the distant future (e.g. climate change).

#### 4.2.4.5 Risk and uncertainty

Risk associated with project outcomes is usually handled using probability theory. This can be factored into the discount rate (to have uncertainty increasing over time), but is usually considered separately. Particular consideration is often given to risk aversion—the irrational preference for avoiding loss over achieving gain. Expected return calculations does not account for the detrimental effect of uncertainty.

Uncertainty in CBA parameters (as opposed to risk of project failure etc.) can be evaluated using a sensitivity analysis, which shows how results respond to parameter changes. Alternatively a more formal risk analysis can be undertaken using Monte Carlo simulations.

## 4.2.4.6 **History**

The concept of CBA dates back to an 1848 article by Jules Dupuit and was formalized in subsequent works by Alfred Marshall. The Corps of Engineers initiated the use of CBA in the US, after the Federal Navigation Act of 1936 effectively required cost–benefit analysis for proposed federal waterway infrastructure. The Flood Control Act of 1939 was instrumental in establishing CBA as federal policy. It demanded that "the benefits to whomever they accrue [be] in excess of the estimated costs.

## 4.2.4.7 Public Policy

The application for broader public policy started from the work of Otto Eckstein, who in 1958 laid out a welfare economics foundation for CBA and its application for water resource development. Over the 1960s, CBA was applied in the US for water quality, recreation travel and land conservation. During this period, the concept of option value was developed to represent the non-tangible value of preserving resources such as national parks.

CBA was later expanded to address both intangible and tangible benefits of public policies relating to mental illness, substance abuse, college education and chemical waste policies. In the US, the National Environmental Policy Act of 1969 first required the application of CBA for regulatory programs, and since then, other governments have enacted similar rules. Government guidebooks for the application of CBA to public policies include the Canadian guide for regulatory analysis, Australian guide for regulation and finance, US guide for health care programs, and US guide for emergency management programs.

#### 4.2.4.8 Transportation Investment

CBA application for transport investment started in the UK, with the M1 motorway project in 1960. It was later applied on many projects including London Underground's Victoria Line. Later, the New Approach to Appraisal (NATA) was introduced by the then Department for Transport, Environment and the Regions. This presented cost-benefit results and detailed environmental impact assessments in a balanced way. NATA was first applied to national road schemes in the 1998 Roads Review but subsequently rolled out to all transport modes. As of 2011 it was a cornerstone of transport appraisal in the UK and is maintained and developed by the Department for Transport.

The EU's 'Developing Harmonised European Approaches for Transport Costing and Project Assessment' (HEATCO) project, part of its Sixth Framework Programme, reviewed transport appraisal guidance across EU member states and found that significant differences exist between countries. HEATCO's aim was to develop guidelines to harmonise transport appraisal practice across the EU.

Transport Canada promoted the use of CBA for major transport investments with the 1994 issuance of its Guidebook.

In the US, both federal and state transport departments commonly apply CBA, using a variety of available software tools including HERS, BCA.Net, StatBenCost, Cal-BC, and TREDIS. Guides are available from the Federal Highway Administration, Federal Aviation Administration, Minnesota Department of

Transportation, California Department of Transportation (Caltrans), and the Transportation Research Board Transportation Economics Committee.

## 4.2.4.9 Accuracy

The value of a cost–benefit analysis depends on the accuracy of the individual cost and benefit estimates. Comparative studies indicate that such estimates are often flawed, preventing improvements in Pareto and Kaldor-Hicks efficiency. Causes of these inaccuracies include:

- 1. Overreliance on data from past projects (often differing markedly in function or size and the skill levels of the team members)
- 2. Use of subjective impressions by assessment team members
- 3. Inappropriate use of heuristics to derive money cost of the intangible elements
- 4. Confirmation bias among project supporters (looking for reasons to proceed).

Interest groups may attempt to include or exclude significant costs from an analysis to influence the outcome.

In the case of the Ford Pinto (where, because of design flaws, the Pinto was liable to burst into flames in a rear-impact collision), the company's decision was not to issue a recall. Ford's cost–benefit analysis had estimated that based on the number of cars in use and the probable accident rate, deaths due to the design flaw would cost it about \$49.5 million to settle wrongful death lawsuits versus recall costs of \$137.5 million. Ford overlooked (or considered insignificant) the costs of the negative publicity that would result, which forced a recall *and* damaged sales.

In health economics, some analysts think cost-benefit analysis can be an inadequate measure because willingness-to-pay methods of determining the value of human life can be influenced by income level. They support use of variants such as cost-utility analysis and quality-adjusted life year to analyze the effects of health policies.

In environmental and occupational health regulation, it has been argued that if modern cost-benefit analyses had been applied prospectively to decisions such as whether to mandate the removal of lead from gasoline, build the Hoover Dam in the Grand Canyon, and regulate workers' exposure to vinyl chloride, these measures would not have been implemented even though they are considered to be highly successful in retrospect. The Clean Air Act has been cited in retrospective studies as a case where benefits exceeded costs, but the knowledge of the benefits (attributable largely to the benefits of reducing particulate pollution) was not available until many years later.

#### **Review Questions**

- 1. Define the Cost concept?
- 2. Explain the Cost analysis?
- 3. Explain the Quadrants of Cost-Effectiveness?
- 4. Explain the key Attributes of Cost Analyses?

## **Discussion Questions**

Discuss the Cost concept and Cost analysis in details?

## Health determinants

## Lesson 1 – Unique nature of health

## Learning Objectives

- To define the nature of health.
- To explain the determinants of health.
- To explain the Self care.
- To describe the Occupational safety and health.

# 1.1 Nature of health

The word health means different things to different people, depending on the situation. If somebody says "I was worried about my husband's health when he climbed Mt. Everest", it is clear that the woman is referring to her husband's physical health, possibly his heart, skin (frostbite) and risk of developing hypothermia (when the body's temperature drops too low.

On the other hand, if you hear the phrase "With all these deadlines, presentations and working weekends, I wonder what the effect will be on her health," most likely the word "health" refers more to mental health than physical health (although the two are often linked).

The words "health" or "healthy" can also be used in non-medical contexts. For example "A healthy economy needs an ideal GDP growth rate that is sustainable, one that remains in the expansion phase of the business cycle as long as possible."

The English word **''health''** comes from the Old English word *hale*, meaning "wholeness, being whole, sound or well,". *Hale* comes from the Proto-Indo-European root *kailo*, meaning "whole, uninjured, of good omen". *Kailo* comes from the Proto-Germanic root *khalbas*, meaning "something divided".

Medilexicon's medical dictionary has three definitions for health, the first being "*The state of the organism when it functions optimally without evidence of disease or abnormality*" (click here to read the other two).

# 1.2 World Health Organization's (WHO's) definition of "health"

The most famous modern definition of health was created during a Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (*Official Records of the World Health Organization, no. 2, p. 100*) and entered into force on 7 April 1948.

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

The Definition has not been amended since 1948.

During the Ottawa Charter for Health Promotion in 1986, the WHO said that health is:

"a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities."

# 1.3 The Lancet questions WHO's definition of health

An article in *The Lancet* states that health is not a "*state of complete physical, mental, and social well-being*". Neither is it "*merely the absence of disease or infirmity*". The article says the WHO definitions of health will not do in an era marked by new understandings of disease at molecular, individual, and societal levels. (*The Lancet, Volume 373, Issue 9666, Page 781, 7 March 2009*).

# 1.4 Two aspects to health

Most people accept that health can be divided into two broad aspects - physical and mental health.

# 1.4.1 Physical health

For humans, physical health means a good body health, which is healthy because of regular physical activity (exercise), good nutrition, and adequate rest.

As a country's or region's people experience improved nutrition, health care, standards of living and quality of life, their height and weight generally increase.

In fact, most people, when asked for a definition of health talk about physical health. Physical health relates to anything concerning our bodies as physical entities. Physical health has been the basis for active living campaigns and the many nutrition drives that have swept the industrialized world. People are exposed to so much "physical health" data these days that it is hard to decide what is relevant and what is not.

Another term for physical health is *physical wellbeing*. Physical wellbeing is defined as something a person can achieve by developing all health-related components of his/her lifestyle. Fitness reflects a person's cardiorespiratory endurance, muscular strength, flexibility, and body composition. Other contributors to physical wellbeing may include proper nutrition, bodyweight management, abstaining from drug abuse, avoiding alcohol abuse, responsible sexual behavior (sexual health), hygiene, and getting the right amount of sleep.

Some people divide physical health into two separate sections:

**Structural health** - this refers to sound bones, muscles, organs etc. That the structures in the body are performing the functions they were made for properly. Structural health is associated with a person's height/weight ratio, their BMI (body mass index), their resting pulse rate (heart rate), and recovery time after doing exercise.

**Chemical Health** - good chemical health means that the chemicals in the person's body are correct, that tissues contain the right balance of nutrients, etc., and there are no toxic chemicals.

We may inhale or swallow natural and synthetic chemicals; they can also get into our body

through skin. In most cases, the body can break these chemicals down or excrete them, so that there is no risk of toxic overload.

Some chemicals can harm or destroy cells and tissues, while others may affect genetic material directly, which can increase the risk of developing cancer.

## 1.4.2 Mental health

Mental health refers to people's cognitive and emotional well-being. A person who enjoys good mental health does not have a mental disorder. According to WHO, mental health is "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community".

No matter how many definitions people try to come up with regarding *mental health*, its assessment is still a subjective one.

People have always found it easier to explain what mental illness is, rather than mental health. Most people agree that mental health refers to the "absence of mental illness". For some, this definition is not enough. They argue that if you pick 100 people who do not suffer from any mental disorder or illness that could be diagnosed by a psychiatrist, some people within those 100 will be mentally healthier than others. Most people also agree that mental health includes the ability to enjoy life, the ability to bounce back from adversity, the ability to achieve balance (moderation), the ability to be flexible and adapt, the ability to feel safe and secure, and self-actualization (making the best of what you have).

#### **1.5 Determinants of health**

The health of individual people and their communities are affected by a wide range of contributory factors. People's good or bad health is determined by their environment and situations - what is happening and what has happened to them, says WHO. WHO says that the following factors probably have a bigger impact on our health than access and use of health care services:

- Where we live
- The state of our environment
- Genetics
- Our income
- Our education level
- Our relationship with friends and family

#### **1.5.1 WHO says the main determinants to health are:**

- Our economy and society ("The social and economic environment")
- Where we live, what is physically around us ("The physical environment")
- What we are and what we do ("The person's individual characteristics and behaviors")

As our good health depends on the context of our lives, praising or criticizing people for their good or bad health is wrong. Most of the factors that contribute towards our good or bad health are out of our control. According to WHO, these factors (determinants), include the following, among others:

- Socioeconomic status the higher a person's socioeconomic status is, the more likely he/she is to enjoy good health. The link is a clear one. Socioeconomic status affects all members of the family, including newborn babies. Australian researchers found that women of lower socioeconomic status are less likely to breastfeed their newborn babies a factor which will have an impact on the health of the baby just as he/she enters the world. A South Korean study revealed a clear link between low socioeconomic status and heart attack and stroke risk.
- **Education** people with lower levels of education generally have a higher risk of experiencing poorer health. Their levels of stress will most likely be higher, compared to people with higher academic qualifications. A person with a high level of education will probably have greater self-esteem.

A study carried out by researchers at Northwestern University Feinberg School of Medicine, Chicago, found that elderly people who had a higher level of *health literacy* were more likely to live longer.

Another study from San Francisco VA Medical Center found that literacy at less than a ninthgrade level almost doubles the five-year risk of mortality among elderly people.

• **Physical environment** - if your water is clean and safe, the air you breathe is pure, your workplace is healthy, your house is comfortable and safe, you are more likely to enjoy good health compared to somebody whose water supply is not clean and safe, the air he/she breathes is contaminated, the workplace is unhealthy, etc.

A study carried out by researchers at Zuyd University, The Netherlands, found that just an hour of sniffing car exhaust fumes induces a stress response in the brain's activity.

Another study carried out at Indiana University-Purdue University found that chronic lead poisoning, caused in part by the ingestion of contaminated dirt, affects hundreds of thousands more children in the United States than the acute lead poisoning associated with imported toys or jewelry.

- Job prospects and employment conditions if you have a job, statistics show you are more likely to enjoy better health than people who are unemployed. If you have some control over your working conditions your health will benefit too. Researchers at State University of New York at Albany found that workers who lost their job through no fault of their own were twice as likely as continuously employed workers to report over the next 18 months that they developed a new illness, such as high blood pressure, diabetes or heart disease.
- Support from people around you if you have family support, as well as support from friends and your community your chances of enjoying good health are far greater than somebody who has none of these things. A team from the University of Washington found that strong family support, not peer support, is protective in reducing future suicidal behavior among young adults when they have experienced depression or have attempted suicide.
- **Culture** the traditions and customs of a society and how a family responds to them play an important role in people's health. The impact could be either good or bad for health. The tradition of genital mutilation of women has an impact on infection rates and the mental health of millions of girls and women in many countries. A study published in the *Journal of Epidemiology and Community Health* found that when young people dress according to the customs of their own ethnic group, they may be less likely to have mental health problems later in life.
- **Genetic inheritance** people's longevity, general health, and propensity to certain diseases are partly determined by their genetic makeup. Researchers from Vrije Universiteit, Holland, the Medical College of Georgia, USA, and Duke University, USA showed that people's genes play a key role in how they respond both biologically and psychologically to stress in their environment.

- What we do and how we manage what we eat, our physical activity, whether or not we smoke or drink or take drugs, and how we cope with stress play an important role on our physical and mental well-being.
- Access and use of health services a society that has access and uses good quality health services is more likely to enjoy better health than one that doesn't. For example, developed countries that have universal health care services have longer life expectancies for their people compared to developed countries that don't.
- **Gender** men and women are susceptible to some different diseases, conditions and physical experiences, which play a role in our general health.

For example, childbirth, ovarian cancer, and cervical cancer, are experienced only by women, while prostate cancer, testicular cancer are only experienced by men.

During wars, more men than women tend to be called up to fight, and subsequently become injured or die. Adult women are more likely to be the physical victims of domestic abuse, compared to adult men.

In some societies women are not given the same access to education as men - education is a factor that influences health. Many studies have revealed gender disparities in healthcare services, even in developed countries.

## 1.6 What is wellness?

The term wellness was first used by a doctor called Halbert L. Dunn, USA, who published a small booklet entitled *"High Level Wellness"* in 1961. The term is much more widely used in North American than in the United Kingdom.

According to the Mickinley Health Center, University of Illinois, wellness "is a state of optimal wellbeing that is oriented toward maximizing an individual's potential. This is a life-long process of moving towards enhancing your physical, intellectual, emotional, social, spiritual, and environmental wellbeing."

The University of East Carolina defines wellness as "the integration of mind, body and spirit. Optimal wellness allows us to achieve our goals and find meaning and purpose in our lives. Wellness combines seven dimensions of well-being into a quality way of living. Overall, wellness is the ability to live life to the fullest and to maximize personal potential in a variety of ways. Wellness involves continually learning and making changes to enhance your state of wellness. When we balance the physical, intellectual, emotional, social, occupational, spiritual, and environmental aspects of life, we achieve true wellness."

According to Medilexicon's medical dictionary, wellness is "A philosophy of life and personal hygiene that views health as not merely the absence of illness but the full realization of one's physical and mental potential, as achieved through positive attitudes, fitness training, a diet low in fat and high in fiber, and the avoidance of unhealthful practices (smoking, drug and alcohol abuse, overeating)".

# 1.7 Self care

**Self care** is personal health maintenance. It is any activity of an individual, family or community, with the intention of improving or restoring health, or treating or preventing disease.

Self care includes all health decisions people (as individuals or consumers) make for themselves and their families to get and stay physically and mentally fit. Self care is exercising to maintain physical fitness and good mental health. It is also eating well, practicing good hygiene and avoiding health hazards such as smoking and drinking to prevent ill health. Self care is also taking care of minor ailments, long term conditions, or one's own health after discharge from secondary and tertiary health care.

Individuals do self care, and experts and professionals support self care to enable individuals to do enhanced self care.

Self care support has crucial enabling value and considerable scope in developing countries with an already overburdened health care system. But it also has an essential role to play in affluent countries where people are becoming more conscious about their health and want to have a greater role in taking care of themselves.

To enable people to do enhanced self care, they can be supported in various ways and by different service providers.

# 1.7.1 Self care support

Self care support can include the following:

- Self care information on health and human body systems, lifestyle, physical activity, or healthy eating
- Support to capture, manage, interpret, and report Observations of Daily Living (ODLs), the tracking of trends, and the use of the resulting information as clues for self care action and decision making.
- Information prescriptions providing personalised information and instructions to enable an individual to self care and take control of their health
- Self care and self monitoring devices and assistive technology
- Self care skills and life skills training programmes and courses for people
- Aid from spiritual care givers
- Advice from licensed counselors, clinical social workers, psychotherapists, pharmacists, physiotherapists and complementary therapists
- Self care support networks which can be face to face or virtual, and made up of peers or people who want to provide support to others or receive support and information from others. (Including a self care Primer for provider/consumer convergence.)

# **1.8 Occupational safety and health**

**Occupational safety and health** is an area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goals of occupational safety and health programs include to foster a safe and healthy work environment. OSH may also protect co-workers, family members, employers, customers, and many others who might be affected by the workplace environment.

Occupational safety and health can be important for moral, legal, and financial reasons. All organizations have a duty of care to ensure that employees and any other person who may be affected by the companies undertaking remain safe at all times. Moral obligations would involve the protection of employee's lives and health. Legal reasons for OSH practices relate to the preventative, punitive and compensatory effects of laws that protect worker's safety and health. OSH can also reduce employee injury and illness related costs, including medical care, sick leave and disability benefit costs. OSH may involve interactions

among many subject areas, including occupational medicine, occupational hygiene, public health, safety engineering, industrial engineering, chemistry, health physics, ergonomics and occupational health psychology.

# 1.8.1 **Definition**

Since 1950, the International Labour Organization (ILO) and the World Health Organization (WHO) have shared a common definition of occupational health. It was adopted by the Joint ILO/WHO Committee on Occupational Health at its first session in 1950 and revised at its twelfth session in 1995. The definition reads:

"Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man and of each man to his job.

"The main focus in occupational health is on three different objectives: (i) the maintenance and promotion of workers' health and working capacity; (ii) the improvement of working environment and work to become conducive to safety and health and (iii) development of work organizations and working cultures in a direction which supports health and safety at work and in doing so also promotes a positive social climate and smooth operation and may enhance productivity of the undertakings. The concept of working culture is intended in this context to mean a reflection of the essential value systems adopted by the undertaking concerned. Such a culture is reflected in practice in the managerial systems, personnel policy, principles for participation, training policies and quality management of the undertaking."

-Joint ILO/WHO Committee on Occupational Health

# 1.8.2 Workplace hazards

#### 1.8.2.1 Physical and mechanical hazards

Physical hazards are a common source of injuries in many industries. They are perhaps unavoidable in many industries such as construction and mining, but over time people have developed safety methods and procedures to manage the risks of physical danger in the workplace. Employment of children may pose special problems.

Falls are a common cause of occupational injuries and fatalities, especially in construction, extraction, transportation, healthcare, and building cleaning and maintenance.

An engineering workshop specializing in the fabrication and welding of components has to follow the Personal Protective Equipment (PPE) at work regulations 1992. It is an employers duty to provide 'all equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work which him against one or more risks to his health and safety'. In a fabrication and welding workshop an employer would be required to provide face and eye protection, safety footwear, overalls and other necessary PPE.

Machines are commonplace in many industries, including manufacturing, mining, construction and agriculture, and can be dangerous to workers. Many machines involve moving parts, sharp edges, hot surfaces and other hazards with the potential to crush, burn, cut, shear, stab or otherwise strike or wound workers if used unsafely. Various safety measures exist to minimize these hazards, including lockout-tagout procedures for machine maintenance and roll over protection systems for vehicles. According to the United States Bureau of Labor Statistics, machine-related injuries were responsible for 64,170 cases that required days away from work in 2008. More than a quarter of these cases required more than 31 days spent away from work. That same year, machines were the primary or secondary source of over 600 work-related fatalities. Machines are also often involved indirectly in worker deaths and injuries, such as in cases in which a worker slips and falls, possibly upon a sharp or pointed object.

Confined spaces also present a work hazard. The National Institute of Occupational Safety and Health defines "confined space" as having limited openings for entry and exit and unfavorable natural ventilation, and which is not intended for continuous employee occupancy. These kind of spaces can include storage tanks, ship compartments, sewers, and pipelines. Confined spaces can pose a hazard not just to workers, but also to people who try to rescue them.

Noise also presents a fairly common workplace hazard: occupational hearing loss is the most common work-related injury in the United States, with 22 million workers exposed to hazardous noise levels at work and an estimated \$242 million spent annually on worker's compensation for hearing loss disability. Noise is not the only source of occupational hearing loss; exposure to chemicals such as aromatic solvents and metals including lead, arsenic, and mercury can also cause hearing loss.

Temperature extremes can also pose a danger to workers. Heat stress can cause heat stroke, exhaustion, cramps, and rashes. Heat can also fog up safety glasses or cause sweaty palms or dizziness, all of which increase the risk of other injuries. Workers near hot surfaces or steam also are at risk for burns. Dehydration may also result from overexposure to heat. Cold stress also poses a danger to many workers. Overexposure to cold conditions or extreme cold can lead to hypothermia, frostbite, trench foot, or chilblains.

Electricity poses a danger to many workers. Electrical injuries can be divided into four types: fatal electrocution, electric shock, burns, and falls caused by contact with electric energy.

Vibrating machinery, lighting, and air pressure can also cause work-related illness and injury. Asphyxiation is another potential work hazard in certain situations. Musculoskeletal disorders are avoided by the employment of good ergonomic design and the reduction of repeated strenuous movements or lifts.

#### **Review Questions**

- 1. Define the nature of health?
- 2. Explain the determinants of health?
- 3. Explain the wellness?
- 4. Explain the Self care?

**Discussion Questions** 

Discuss the Occupational safety and health?

## Lesson 2 - Health as a consumer and investment goods

#### Learning Objectives

- To define the Health as a consumer goods.
- To explain the Consumer Health.
- To explain the Strategies for Success in health market.
- To describe the Lifestyle choices of consumer health.

#### 2.1 Health as a consumer goods

A new market of consumer-focused healthcare products is emerging to occupy the space between consumer goods and pharmaceuticals—and becoming a battleground that giants in both industries are gearing up to dominate.

Many factors—consumer awareness of health issues, higher personal incomes, more focus on fitness, and the urbanization of emerging economies, just to name a few—have combined to create a new market for healthcare products. And the world's leading pharmaceutical and consumer goods companies are eager to do battle for this new market's seemingly unlimited potential.

These companies bring different strengths—and weaknesses—to the battle. We believe the consumer health company of the future will be an amalgam of the two industries, able to engage consumers and prove the clinical effectiveness of their products and as adept at dealing with medical professionals as negotiating supermarket shelf space. Even more important, such a company will have the ability to identify unmet consumer needs and develop innovative ways to unlock true value in the marketplace.

In this second paper in a series on the consumer health industry, we explore answers to questions our consumer health clients are asking.<sup>1</sup> Which categories should we focus on? Can we succeed with global products and brands, or is this a local market play? How should the product be positioned between consumer goods and prescription drugs? Where should we focus—on developed or developing markets, or both? How do we manage specialist and mass-market channels? What's the best operating model for us?

The fight for the consumer health market is a war with multiple fronts, and participants will have to organize effectively, move swiftly, and know which battles they must take on and which tactics will ensure victory.

#### 2.2 Defining Consumer Health

The consumer health market covers a wide range of categories and products, all of which claim to improve some aspect of health or wellbeing and are not generally reimbursed by healthcare systems. Product characteristics vary widely, with the two most essential dimensions being the consumer needs they address and the strength of the claims they make.

# Figure 1 Defining the consumer health market



## 2.2.1 Needs addressed by product

Consumers' needs vary widely depending on their state of health. For people who are generally healthy, product need is associated with some aspirational state, such as having more energy, being fitter, or looking younger. People who are not healthy need treatments for their maladies. In between are people who are neither really healthy nor really ill—they just need to relieve a headache, soothe aching muscles, or do what they can to prevent future illnesses.

The differences between being healthy and ill, of course, are far from clear-cut, and there are plenty of examples of medicalization, where a natural human condition—erectile dysfunction, for example—gets classified as a medical condition. This is often driven by the emergence of products that treat the condition. There is also a trend to promote products as being preventive in nature, which generates a more predictable buying pattern and higher revenue. While some products claim only to soothe an upset stomach or ease a headache, others claim to prevent far more serious afflictions. Some of these products have been clinically proven to do what they claim, such as the use of low-dose aspirin to reduce heart-attack risks and, more recently, ward off cancer metastasis. Others, such as some mineral supplements, may, at best, do no harm. For example, the Journal of the National Cancer Institute found that there is "little to no scientific evidence that supplements reduce cancer risk" but that "high doses of some supplements (such as beta carotene) increase cancer risk."<sup>2</sup>

#### 2.2.2 Strength of the claim

The second dimension is the strength of the product's claim. Any product made with a pharmaceutically active ingredient is subject to stringent standards of proof of efficacy and safety, and this encompasses much of the over-the-counter (OTC) market. The limits are clear about what claims can be made and, often, the channels through which these products can be sold. However, the limits are fuzzy for less-regulated products about which manufacturers sometimes make plainly untrue assertions about effectiveness. For example, it's hard to prove that hydration is not best performed by water.

The burden of proof required to make any health claims is increasing. In May 2012, for example, the European Commission (EC) approved 222 health claims on food and rejected 1,700. The commission now requires companies to substantiate their claims. Food isn't the only category drawing more regulatory scrutiny in Europe. The EC now requires scientific proof of sunscreen protection factors, and manufacturers of products made with the Chinese curative ginseng are being challenged in some markets to prove its powers. Indeed, in markets such as Spain, ginseng is regulated as a pharmaceutical ingredient in several jurisdictions. The EC has also recently tightened the regulation of traditional herbal remedies and now requires such medicines to be assessed by national regulatory agencies before they can go on sale.

Manufacturers are also making moves to emphasize scientific claims as a way of capturing market share or justifying a price premium. Boots No7 skincare products, for example, are promoted as being clinically proven treatments for wrinkles and other skin flaws, and L'Oreal has invested in large randomized trials for its facial creams. The latter claims that its Vichy LiftActiv Retinol HA anti-aging skincare product is backed by a clinical trial involving 52 women, while its Vichy Night Care anti-wrinkle cream has undergone no fewer than seven clinical trials involving 300 women.

In short, the consumer health war is shaping up on two fronts. On one side, the pharma industry is addressing explicit health needs with scientifically proven products, and learning how to market these products more effectively. On the other side, the consumer packaged goods industry is using compelling marketing stories about how quality of life can be improved, and learning to back up those claims with scientific evidence.

## 2.2.3 Choosing the Battlefield

With such a wide range of product categories to choose from, the question becomes which battle to fight—and where? Which categories are hot? Which markets are driving the most growth? Given the rise of chronic diseases, higher household incomes, and more consumer knowledge and awareness about health, one would expect the consumer health market to be growing by leaps and bounds everywhere. This is not the case.

Globally, consumer health markets are growing at an average of 5.7 percent but are lagging overall GDP growth. Compared to other categories, consumer health grows at a snail's pace, particularly when times are good. For example, between 2005 and 2012, consumer health categories in India grew by less than 13 percent a year, but the cosmetics market grew more than 27 percent per year. There is also a common belief that the market is being driven by consumers bearing an increasing burden of health costs. Not so: The proportion is actually falling, and consumer health spending generally lags overall health spending.

## Figure 2 Consumer healthcare in most markets is barely keeping up with gross domestic product (GDP)



Notes: Consumer healthcare is defined here as over-the-counter, sport nutrition, vitamins and dietary supplements, weight management, herbal and traditional, allergy products, and child-specific products. Historic data at constant Economist Intelligence Unit average 2010 exchange rates to \$. Sources: Euromonitor; A.T. Kearney analysis

#### Figure 3 Out-of-pocket payments as percent of healthcare spend



Sources: World Health Organization; Health Status and Health Service Utilisation Q3 2008, Central Statistics Office; Health and Safety Executive Annual Report 2008

Several things are responsible for this relatively slow growth. First, getting people to become more health conscious is not easy. According to Eurostat, 80 percent of the UK population believe themselves to be in

good or very good health, and only 5 percent consider themselves to be in bad health—this in a country where 23 percent of the people are obese and more than 30 percent have hypertension. Even when people do know they're unhealthy, they look to their health system for treatment rather than address the problem themselves.

Second, the market faces a real innovation deficit. Portfolios of leading consumer health companies feature products that are an average of 30 to 50 years old. The OTC market has historically been driven by so-called Rx-to-OTC switches, where drugs containing certain pharmaceutical ingredients and available only with a prescription are licensed for sale over the counter once their safety profile is well established (and, typically, once the product has lost its patent protection). However, only a handful of active ingredients have achieved OTC-switch status in the United States over the past five years. Meanwhile, the pipeline of new pharmaceutical ingredients coming off patent is drying up, and the few that do exist, such as anti-psychotics and biopharmaceuticals, are unlikely to be suitable for purchase over the counter. In this market, innovation has been basically limited to marketing and product variants rather than scientific efforts.

This isn't to say the market lacks sweet spots of significant growth opportunities. A look at historical growth rates reveals that the relatively new lifestyle categories, such as food supplements and energy drinks, are driving market growth, signaling a shift from illness to wellness as the new consumer motivator.

## 2.2.4 Potential Hot Markets

Not surprisingly, emerging markets such as Brazil and India are showing the greatest growth rate in consumer health, just as they are in many other categories. But these markets are still relatively small compared with the huge U.S. and Western Europe markets. The true picture emerges when we look at combinations of categories and geographies to find the hot spots for growth.

#### Figure 4 Growth of OTC market, 2005-2015e



Note: OTC is over-the-counter; MSP is Medicare secondary payer.

Sales data: retail value MSP/\$ billion, historic constant 2011 prices, forecast constant 2011 prices, historic fixed 2011 exchange rates, forecast fixed 2011 exchange rates

<sup>2</sup>Includes calming and sleeping, wound care, ear care, eye care, smoking cessation using nicotine replacement therapy, emergency contraception, OTC triptans, and adult mouth care.

Sources: Euromonitor, 2010: Consumer Health, Passport database; A.T. Kearney analysis

#### Figure 5 Hot spots for growth

Top 25 segment opportunities, 2006-2011 (\$ million, MSP')

	North America	Western Europe	Asia Pacific	Latin America	Eastern Europe	Middle East and Africa	Australasia
Vitamins and dietary supplements	3.371	941	5,671	1,022	767	386	
Herbal and traditional products			2,529	387			
Digestive				590			
Cough, cold, and allergy	990		1,264	1,090	812		
Analgesics			657	866			
Sport nutrition	1,583	480					
Pediatric consumer health			1,098	445			
Medicated skin care			1,008	423			
Weight management			651	389			
Tonic and nutritive drinks			389				
Traditional lifestyle OTC <sup>2</sup>			381				

📕 High growth 📕 Higher growth 📕 Highest growth

Note: MSP is manufacturer's selling price.

Sales data: retail value MSP/\$ billion, historic constant 2011 prices, forecast constant 2011 prices, historic fixed 2011 exchange rates, forecast fixed 2011 exchange rates

<sup>3</sup>Includes calming and sleeping, wound care, ear care, eye care, smoking cessation using nicotine replacement therapy, emergency contraception, OTC triptans, and adult mouth care.

Sources: Euromonitor, 2010: Consumer Health, Passport database; A.T. Kearney analysis

Perhaps the most disappointing statistic we see is the lack of growth in Western Europe. This is particularly surprising given that health needs increase with age, and Western Europe will hold more than 35 percent of the world's "gray wealth" over the next decade—more than twice that of Brazil, Russia, India, and China combined, providing a huge and largely untapped market.<sup>3</sup> However, a glance at the pharmacy and supermarket shelf shows that consumer health companies seem satisfied promoting trendy health supplements to young people who do not need them, rather than providing solutions to the very real health problems older people face.

Generally speaking, choosing the right battles has been the strategy for success in the consumer health market. We analyzed the performance of leading consumer health companies to see what had driven their growth. After stripping out the impact of acquisitions, we found that 20 to 35 percent of all growth could be explained by the natural growth of local categories, largely driven by demographics, with another 50 to70 percent being driven by acquisitions. Only 10 to 15 percent came from any type of market-share growth. This is proof that being in the right place—or choosing the right battlefield—matters. The battle still has to be won, however, and that's where tactics come into play.

#### 2.2.6 Winning Tactics

Given their respective histories, one would expect our two protagonists to approach the market battle with very different mindsets. Consumer goods companies would try to build global brands and use marketing muscle to win supermarket shelf space. Pharma, on the other hand, would use Rx-to-OTC switches as a source of innovation, maintaining their grip on pharmacy and specialist channels and building a portfolio of local assets. Indeed, this is pretty much what we found: Players apply the tactics they are most comfortable with and apply much the same approach across the portfolio.

It is difficult to say which is the winning model. In fact, we aren't convinced that either approach is inherently superior. The best tactics will depend on the category and the geography and the type of company you want to be. The two most important decisions will be the brand's role and the distribution channels.

#### 2.2.7 Brand versus Category

Consumer goods and pharma companies define "brand" quite differently. To a consumer goods company, a brand is the articulation of a relationship with a consumer, encompassing personal aspirations, trust, and promises of performance. To a pharmaceutical company, a brand is a molecule—and the value of some of these molecules is enormous. Lipitor, a cholesterol-lowering drug, has achieved sales of more than \$25 billion a year. To put this into perspective, Coca-Cola generated \$31 billion in revenue in 2009.

Unfortunately, it is hard to find any consumer health category where global brands under either definition have made any significant impact. A look at top brands across categories shows that global brands rarely achieve more than a few percentage points of market share.

#### Figure 6

#### Top brands have achieved only small market share



Top five brands in five categories (% of global market share, 2011')

'Retail selling price

Figures may not resolve due to rounding. Sources: Euromonitor: A.T. Kearney analysis This is especially true in Asian growth markets, where local brands are king. A good example is traditional medicine, which dominates China's fast-growing minerals and supplements market.

This does not mean that trying to build global brands is a pointless strategy. Big brands are a proven way to access growing mass-market channels. One need look no further than the story of Yakult and Danone probiotic health drinks, which clearly demonstrates how a large global company with a brand-led marketing strategy can overwhelm a local specialist. Global brands are also a good strategy for genuinely innovative products—though as we have mentioned, product innovation is sadly lacking in the consumer health industry.

However, the reality is that in most markets, consumer health companies will have to build on existing local brands that embody trusted relationships and are tailored to local needs. For this reason, it is probably more productive to pursue category leadership than building global brands.

We believe that if consumer health is to achieve its full potential, it needs to grow beyond Rx-to-OTC switches and clever marketing. It needs to develop science that truly addresses the health needs of the aging and chronically ill and build the expertise to reach out to consumers and help them embrace their own health needs. It needs to convince consumers and health professionals alike that its products are safe and effective, and generate the evidence to prove it.

It is enlightening to look at the evolution of the food industry, where many companies are adopting the category platform model. Innovation, technology, product concepts, and formats are shared across countries, while the brands with very strong local consumer loyalty are maintained.

#### 2.2.8 Specialist versus Mass-Market Channels

Nothing illustrates the battle for consumer healthcare more clearly than the choice of distribution channels. Historically, pharmacies have been the dominant consumer health channel, protected by both tough regulation and customer expectations of where health products should be sold. However, there is a trend for deregulation, supermarkets are becoming more credible for health and beauty products, and much of the growth is coming from lifestyle products. Also, while developing countries such as India and China are seeing an expansion of pharmacies, pharmacy floor area in most developed markets—and even in Russia and Brazil—is declining, according to Data monitor.

Overall, this means that most of the growth in consumer health sales, even OTC medicines, is occurring in mass-market channels.

## Figure 7 Share of OTC growth per channel and region



(% of MSP growth, \$ million, 2006-2011)

Note: OTC is over-the-counter; MSP is manufacturer's selling price.

Projected 2011 sales data: \$ million, historic constant 2011 prices, forecast constant 2011 prices, historic fixed 2011 exchange rates,

<sup>3</sup>Specialist healthcare retailers, pharmacy category including chemists and pharmacies, parapharmacies and drugstores, and other healthcare specialists. Other retailers including non-store retailing, other non-grocery retailers, and mixed retailers

Source: Euromonitor, 2010: Consumer Health, Passport database

Do pharmacies and specialist channels matter anymore? Absolutely. First, pharmacy deregulation has proved to be incredibly slow in most markets, so pharmacies remain the only route to market for many products. Second, margins generated in pharmacies and specialist channels are generally far higher than in supermarkets. Finally, specialist channels such as pharmacies and dentists provide the expert endorsements that justify premium pricing, which can carry over to the supermarket shelf.

The key for the successful consumer health company is to use specialist channels to maintain clinical credibility while using mass-market channels to achieve wide distribution—easier said than done, to be sure. In the oral care area, for example, some manufacturers have achieved such a channel triple play with distribution through dentists, pharmacists, and supermarkets, positioning their products as professionally endorsed and therefore retaining a significant premium price point as a result. This requires the kind of multichannel mastery that few consumer health companies can achieve.

# 2.2.9 Four Strategies for Success

With this in mind, A.T. Kearney developed four basic strategies that build on the traditional strengths of both the pharmaceutical and consumer goods industries. Appropriately enough, they take as their starting point either the consumer or science-based industries.

forecast fixed 2011 exchange rates

#### Figure 8 Battle strategies for consumer healthcare



# 2.2.9.1 Mass-market maximize

This is a traditional consumer goods play. The idea is to identify niche products currently confined to specialist channels and use brand-led marketing to grow—as we saw in the probiotic health drink example. In this strategy, the premium of professional endorsement is sacrificed for volume. Shelf space is maximized through traditional tools of flavors and multi-packs, and retail collaboration is increasingly the source of innovation. This works well for aspirational products, for which professional recommendations are less important.

# 2.2.9.2 Category champion

A refinement of the mass-market maximizer strategy, the category champion positions the consumer health company as trusted supplier for specific health needs. Scientific credibility, professional endorsement, wide distribution, consumer insight, and smart marketing are all key requirements. Oral care and baby care are good examples, and this will probably be the winning strategy for areas such as diabetic food. This strategy requires a broad mix of pharmaceutical and consumer goods capabilities and the ability to apply science to consumer needs and create innovative ways of engaging consumers. It requires both sales skills to medical professionals and old-fashioned shelf-space battles in retail channels.

# 2.2.9.3 Discovery-driven disruptor

For companies that boast genuinely new science, the discovery-driven disruptor emerges as a strategic option. The market potential is immense for any company able to develop consumer products that delay the onset of dementia or diabetes, for example—but the science has to work. Products in this category include foods and drinks, and also services and technology. Addressing chronic diseases may well require more than consumers buying a product—it will require them to get involved in a program that changes

their behavior. The weight-loss market provides a good example. Virtually every "magic pill" has failed to take off, as was the case with GlaxoSmithKline's Alli, a weight-loss product that, despite a skillful global launch, exhibited distressing side effects that rendered it unsuitable for unsupervised use.<sup>5</sup> Meanwhile, behavioral programs such as Weight Watchers thrive. Such health-oriented programs are a challenge to pull off successfully: Getting people to manage their weight is analogous to Nike's decades-long campaign to get them to run.

But with Rx-to-OTC switches coming to an end, where will innovation come from? Every pharma company has a large parts bin of rejected molecules that failed to provide sufficient benefit in clinical trials or weren't patentable or worth reimbursement.<sup>6</sup> This would be a good place to start looking. Remember, Viagra is just a failed heart drug.

# 2.2.9.4 Scientific specialist

The scientific specialist produces products that meet health needs but are not reimbursed or are given as adjuvant therapies to more conventional medical interventions; a typical example would be dysphagia (difficulty in swallowing) and specialist nutrition. Distribution will be through specialist retailers or health professionals, with professional and peer recommendations the essential selling tools. This is probably the easiest area for pharma companies to enter, although consumer goods companies such as Nestle and Danone are significantly invested in this strategy.

Which strategy is the right one? The answer will depend on the battleground—the category and geography—as much as the heritage of the company itself. This raises the question as to how many diverse strategies an individual company can pursue and what breadth of portfolio it can successfully support.

#### 2.2.10 Organizing for Success

Most consumer health companies face two major organizational decisions: the degree to which the business should be decentralized or globally driven and whether consumer health is such a different business that it needs to be run independently of the main business, be it pharma or consumer goods.

Not surprisingly, leading consumer health companies tend to build their organizational model around that used by the "mother ship." Consumer goods companies tend toward centralized brand management and innovation, global manufacturing, and local brand activation. Pharma companies tend to be more localized. Given that growth for most of these companies has come through local acquisition, many are an organizational mess of fragmented, underpowered portfolios and complexity.

We believe there are obvious areas that can—indeed, should—be leveraged globally. The science and expertise that drive a product's efficacy are definite assets that should be leveraged, and there is a glaring need for a strong strategic center to manage acquisitions and the overall portfolio. At the same time, however, we believe multiple geographic hubs could become essential for acquiring exposure to alternative sciences and reacting to varied consumer attitudes toward healthcare. For many products, global sourcing and manufacturing make sense. A global brand or category-led approach will tend to lead to centralized marketing activities, leaving sales, trade management, and brand activation as the core responsibility of the local affiliates.

Now we come to the key question of whether consumer health should be run as a separate business. Our answer is an emphatic yes. Applying pharmaceutical approaches to quality management makes consumer products too expensive and innovation too slow, and we have seen consumer healthcare portfolios

destroyed by overzealous lawyers and regulatory officers applying pharma standards of claims and risk. And pharma manufacturing and supply-chain organizations have nowhere near the flexibility required of a promotions-driven business.

On the other hand, the cavalier approach consumer goods companies often take can cause huge problems for a company that relies on the strength of its health claims. Marketers have difficulty dealing with the rigors of regulatory filings, even when they know that the consequences of failing to meet standards for a health product can be catastrophic.

Consumer health is a unique industry, different from either of its parents. When determining the right organization model, consumer health companies should remember that form follows function. Start from an understanding of what will drive success on the chosen battleground and organize accordingly.

## 2.2.11 Who Will Be the Winners?

To quote Prussian military theorist Carl von Clausewitz, "Given the same amount of intelligence, timidity will do a thousand times more damage than audacity." In other words, no matter how good the strategy and tactics, the inability to mobilize always results in defeat.

From our first paper, it would be easy to conclude that consumer goods companies will win the consumer health war. Recent strategic moves by consumer giants seem to confirm this conclusion. Procter & Gamble, for example, is seeking to accelerate the build-up of its regulatory capabilities by joining forces with Teva, a global leader in generic drugs. Nestle is investing \$500 million in a health science division. Danone is transforming into a healthcare company. Pharma companies' moves—minor OTC portfolio reshuffles and a few acquisitions— are rather tentative by comparison. Herr von Clausewitz would not approve.

A closer look at two factors, however, makes the overall outcome less certain. First, while the consumer health industry is bound to consolidate, it will happen by category, and the sheer number of categories guarantees a fragmented industry with room for many players, both large and small, for the foreseeable future. Second, regulation is the wild card. In many large markets, regulators are intervening aggressively, thus changing market rules. If consumer goods companies cannot adapt to these more highly regulated and complex environments, they risk being constrained by categories without serious health claims. The result: missing out on areas with the most potential.

As in all types of evolution, the winners will be those that adapt best to their rapidly changing environment. The winners in consumer health will be an entirely new species, but it is far from clear which gene set will prevail.

#### 2.3 Lifestyle choices of consumer health

With increasing consumer health awareness, combined with pressure on governments to focus on disease prevention and a general trend towards higher personal incomes, a new global market of consumer-focused health products is emerging.

Occupying a space somewhere between consumer goods and pharmaceuticals, the market could provide a significant opportunity for pharmaceutical companies to grow. However, pharma will first need to compete against the global brand-building muscle of the consumer goods industry.

#### 2.3.1 Preventative measures

Consumer interest in health products is by no means a new phenomenon, but with the relatively recent rise of energy drinks, probiotic yoghurts, minerals and supplements, nutrition, anti-ageing products and more sophisticated forms of analgesics, this interest is coalescing into a much more defined and recognizable market.

According to a new study published by AT Kearney, Winning the Battle for Consumer Healthcare: Mobilising for Action, the market includes products that 'claim to improve some aspect of health or wellbeing'. And while the products can vary widely, for the most part success relies on two essential dimensions: fulfilling a consumer need and the strength of the health claim it makes.

Consumer needs can be anything from relieving a headache or preventing an illness to increasing energy levels, optimizing fitness or else looking younger.

Once the need has been recognized, uptake of any of these products is heavily reliant on the strength of its specific claim. However, according to the AT Kearney report, '[t]he burden of proof required to make any health claim is increasing', for example, the European Commission (EC) now requires companies to substantiate any purported health benefits associated with a product. In May 2012 alone the EC approved 222 health claims on food, while rejecting 1,700.

The issue of proof has become a crucial factor in the battle for the consumer health market. But while pharma can address specific health needs with research-based, scientifically proven products, the quality approach used by the industry can leave consumer products too expensive and innovation too slow. And in addition, pharma's manufacturing and supply chain lags behind the flexibility of a promotions-driven business.

#### 2.3.2 Brand building

Historically the two industries operate very differently. Consumer goods companies tend to build global brands and use marketing strength to win supermarket shelf space. Meanwhile, pharma will use Rx-to-OTC switches as a source of innovation, using pharmacies and specialists channels, while also developing portfolios of local assets.

For consumer goods companies, a 'brand' is the 'articulation of a relationship with a consumer, encompassing personal aspirations, trust and promise of performance. For pharma the brand is a molecule, with the potential of enormous value: just think of the cholesterol lowering drug Lipitor, which has achieved sales of more than \$25bn a year.

When it comes to the consumer health market, AT Kearney did insist that building a global brand was not a pointless strategy (an example was given of the global dominance Danone now has over the probiotic health drinks market), however, it did suggest that in most markets, 'consumer health companies will have to build on existing local brands that embody trusted relationships and are tailored to local needs'.

For this reason, leading consumer health companies tend to build organizational models around that used by the 'mother ship': centralized brand management and innovation, global manufacturing, and local brand activation.

So consumer health should be treated as a hybrid of the consumer goods and the pharmaceutical industry. They will need the marketing and distribution prowess of the former and the understanding of health issues and the stringent regulations environments familiar to the latter.

## 2.4 Health Investment

In 1972, Michael Grossman published "On the Concept of Health Capital and the Demand for Health" in the Journal of Political Economy. If there were a Nobel Memorial Prize in Health Economics, he would have won it. Using Gary Becker's household production framework, Grossman revolutionized and formalized how economists think about health.

A key feature of the new framework was the conceptualization of health as something that is produced by individuals and households by combining market inputs, such as nutrition, tobacco, alcohol, and medical care, and non-market inputs, such as own time spent in exercise, information gathering/education, child care, and leisure/relaxation. Another feature of the model is a stock of health capital that depreciates over the life cycle, but that individuals and households can invest in through preventive inputs (again market goods, such as healthy foods, preventive medical care, and non-market own-time spent in, say, exercise). Such investment can add to the stock of health in future states of the world thereby slowing the rate of depreciation, at least over some range of the life cycle. (After all, in the long run, we are all dead.) Inputs such as tobacco (and alcohol at higher consumption levels) have negative marginal product thereby increasing the rate of depreciation and lowering the stock of health capital in future states of the world.

Grossman's model sees humans as demanding health, not medical care per se. Medical care is demanded as input to health production. Health is demanded and produced for the utility it provides as a consumption good in the current time period (because it translates into more healthy days, presumably higher wage income from the productivity gains, and feeling better). However (and this is what was innovative about the Grossman model), health is also demanded as an investment good, that is, a good that if invested in would yield more healthy days over the life cycle. More future healthy days yield utility through the extra earnings that are realized from them. As number of healthy days rises and as the wage rate rises, returns to investment also rise, leading to more investment in health (holding all else constant).

The Grossman model wasn't just theoretically elegant. It also explained a lot of observed human healthrelated behavior. It could account for why individuals with higher rates of time preference were less likely to demand preventive care as a hedge against future (unhealthy) states. It predicted that such individuals would be more responsive to changes in current prices, such as can be achieved by a "sin tax" on tobacco or alcohol, than to new information about future health consequences of consumption of such goods. It predicted that individuals with lower rates of time preference would be more responsive to information about the (future) bad effects of current consumption of goods such as tobacco and alcohol. These effects have been confirmed empirically. The model also predicted that more efficient producers of health (usually the more highly educated) face a lower "shadow price" for health, therefore demanding more of it. (The shadow price can be thought of as the money and time that individuals have to spend in producing an increment in health.) The model also predicted a wide range of wage rate effects on both investment decisions and on the substitution of market goods for own time in the production of own and child health.

What can we learn from this? Well, one thing is that medical care is one input among many to improving our own health now and in the future. Moreover, it may not be the most important input. However, when needed, if delivered too late or not in the right amount, it is likely to have severe negative consequences for the individual. It is necessary, if not sufficient.

It also means that rational economic actors may differ in the amount of health they choose to produce or to invest in. But the reasons for this do not translate readily into "personal accountability." The Grossman model suggests that economic actors who are less efficient at producing health face a higher shadow price. All else equal, they will rationally demand less health. The model suggests that individuals with lower wage rates and life expectancies will face a lower return on investment in own health and will rationally reduce investment in that health. The model suggests that individuals with higher rates of time preference, i.e., they discount future health states at a higher rate, will invest less in achieving those states.

Is it a "free choice" when the (shadow) price of health, the subjective discount rate, and the ROI that condition the choice are determined in large part by a circumstance of birth, early home environment, and even the culture and context into which they live? What does it mean to hold individuals personally accountable for making the rational choice not to invest as much in current or future health as someone judges they should, given the price they face, the discount rate they have inherited, and the ROI they're likely to realize? If they are rationally not purchasing health insurance should we force them to? Are we, in effect, requiring them to be irrationally exuberant? To produce more health and to invest more in future health than their price, time preference, or the ROI would warrant?

Or do we have an obligation as a society and a community, to counter these "market forces" that are so obviously harmful to less educated, less advantaged individuals and to society? Do we "nudge" them to be irrationally exuberant about their own life and health prospects? Do we demand that they over consume and over invest in their own health and penalize them when they rationally opt not to? Or do we offer them more education, greater future opportunity, the potential for a higher wage and a longer life to increase the ROI and reduce their discount rate? Do we subsidize health insurance and provide lower copays and deductibles to reduce their shadow price of health? These are the ways to create the proper incentives for disadvantaged and less educated individuals to invest in their own and their children's health.

If health reform is repealed, if the electorate continues to hear simplistic, but emotionally engaging rhetoric, about personal accountability, free choice, and so-called "rational behavior," one day we will have created an even more unequal society.

The obvious "market solution" is to improve the long run return on investments in health among the disadvantaged through meaningful and effective publicly funded education. The obvious short run "market solution" is to reduce the costs of investment and the shadow price of health for the disadvantaged by providing health insurance cover and reduced out-of-pocket costs.

That these policies are likely to produce a less unequal society and a more educated electorate is pure benefit to a democracy that favors, benefits from, and rewards commercial and individual endeavor.

#### **Review Questions**

- 1. Define the Health as a consumer goods?
- 2. Explain the Consumer Health?
- 3. Explain the Strategies for Success in health market?
- 4. Explain the Lifestyle choices of consumer health?

**Discussion Questions** 

Discuss the health services market in present context?

## Lesson 3 – Valuation in health

#### Learning Objectives

- To define the Valuation in health.
- To explain the Fair Market Value.
- To explain the CUA in health economics.
- To describe the components of Medical Practice Value.

#### 3.1 Valuation in health

One of the most problematic areas of medical practice valuation is establishing a clear understanding of the factors a valuator must assess in order to arrive at an appropriate fair market value for a medical practice. Failure by one valuator or another to understand these factors can lead to an incorrect valuation, usually an overstatement of the true value of the medical practice. The following are factors you should consider when valuing any medical practice. As a colleague once said to me, "Valuation is an art and, unfortunately, not a science."

#### **3.2 Defining Fair Market Value**

According to the *International Glossary of Business Valuation Terms*, fair market value is defined as "The price, expressed in terms of cash equivalents, at which property would change hands between a hypothetical willing and able buyer and a hypothetical willing and able seller, acting at arm's length in an open and unrestricted market, when neither is under compulsion to buy or sell and when both have reasonable knowledge of the relevant facts." This is the definition generally accepted in the valuation community.

Under the Stark II regulations, the following is the definition of fair market value: "Fair market value means the value in arm's length transactions, consistent with the general market value. General market value means the price that an asset would bring as the result of bona fide bargaining between well-informed buyers and sellers who are not otherwise in a position to generate business for the other party, or the compensation that would be included in a service agreement as the result of bona fide bargaining between well-informed parties to the agreement who are not otherwise in a position to generate business for the other party, or the other party, on the date of acquisition of the asset or at the time of the service agreement. Usually, the fair market price is the price at which bona fide sales have been consummated for assets of like type, quality, and quantity in a particular market at the time of acquisition, or the compensation that has been included in bona fide service agreements with comparable terms at the time of the agreement, where the price or compensation has not been determined in any manner that takes into account the volume or value of anticipated or actual referrals."

When valuing a medical practice, it is important to know, therefore, whether or not the Stark regulations
come in to play. Within Stark, any arrangement must be considered "commercially reasonable" in the absence of referrals if the arrangement would make commercial sense if entered into by a reasonable entity of similar type and size and a reasonable physician (or family member or group practice) of similar scope and specialty, even if there were no potential DHS referrals.

So what does this mean if indeed the fair market value is affected by the Stark regulations?

• The Stark definition of fair market value may restrict and prevent the use of certain market comps, since use of such comps may not be "commercially reasonable.".

• Just because a transaction may be "fair market value" does not necessarily make it "commercially reasonable."

# 3.3 Using the Wrong Assumptions in a Fair Market Value Appraisal

All (that's *all*) valuation is about *future cash flow*, not historical cash flow. This is why the Income Approach methodology is commonly used to value a medical practice. This method converts/discounts an anticipated benefits stream in to a single present value amount. The valuation of a medical practice therefore relies upon risk-based assumptions as to what patients, procedures or tests will occur in the future as of the valuation date. So, when projecting out in to the future, does the volume and related expected reimbursement make sense? Is the revenue assumption too aggressive? Does it make sense to increase significantly cash flow revenues in an era of declining physician reimbursement?

You should also look for overstated revenues as well as missing revenues. If overstated revenues are included in the calculation of practice value, the result is often on overstatement of value. To reiterate, the objective is to determine the real income stream of the practice. There are often three types of overstatement situations: (1) the commitment of fraud and abuse by the practice, (2) utilization abuse by the practice, and (3) upcoding of visit services normally due to a lack of coding education by the doctors.

In addition to revenues, take a hard look at the expense assumptions. Do anticipated expenses really match the anticipated revenue stream? You cannot significantly increase gross revenues without possibly adding personnel, increasing space, using additional supply costs, etc.

Finally, when making adjustments to future cash flows and expenses, you must keep in mind the difference between fair market value adjustments and investment value adjustments (which cannot be included in the valuation). Investment value represents what a medical practice might be worth to a potential investor. As such, investment value represents individual investment requirements and opportunities; it reflects the synergies that might occur after the purchase of the medical practice. Many times a person will say, "If you buy or take over this practice, you can increase revenues *x*percent because you'll now be doing these services and I don't currently, or you can eliminate x of expenses because you can move the practice to your location." These are "investment" types of adjustments and should never be included in a fair market value appraisal.

# 3.4 Relying on the Market Approach to Value

This approach is defined as a general way of determining a value indication of a business or business ownership interest using one or more methods that compare to similar businesses that have been sold. In other words, this approach calculates the value of the medical practice based on prices actually paid for comparable entities. It follows the simple mathematical process of determining the sales price as a ratio to net discretionary income available for owner compensation calculated from the comparable sales data, and applying these ratios to revenues of the entity being valued.

But can you *really* find a "comparable" sale of a medical practice today to the one which is being valued? Is the sale transaction(s) you are looking at really "apples to apples?" If you don't so, don't use it in the valuation (*remember:* buyers buy cash flow -i.e., the cash flow of the target medical practice).

When valuing a medical practice, you will need to assess not only these factors but many, many more. A failure to do so could have a major impact on the final valuation figure. Valuators interested in keeping up-to-date on the most current developments in health care might consider training such as is available from the Healthcare Consulting Workshop produced by the National Association of Certified Valuation Analysts (NACVA), which offers information helping valuators, CPAs and other financial professionals understand how to build and expand their health care valuation practice in the face of new and pending legislation.

# 3.5 Cost-utility analysis

**Cost–utility analysis** (CUA) is a form of financial analysis used to guide procurement decisions. The most common and well-known application of this analysis is in pharmacoeconomics, especially health technology assessment (HTA).

## **3.5.1 CUA in health economics**

In health economics the purpose of CUA is to estimate the ratio between the cost of a health-related intervention and the benefit it produces in terms of the number of years lived in full health by the beneficiaries. Hence it can be considered a special case of cost-effectiveness analysis, and the two terms are often used interchangeably.

Cost is measured in monetary units. Benefit needs to be expressed in a way that allows health states that are considered less preferable to full health to be given quantitative values. However, unlike cost-benefit analysis, the benefits do not have to be expressed in monetary terms. In HTAs it is usually expressed in quality-adjusted life years (QALYs).

If, for example, intervention A allows a patient to live for three additional years than if no intervention had taken place, but only with a quality of life weight of 0.6, then the intervention confers 3 \* 0.6 = 1.8 QALYs to the patient. If intervention B confers two extra years of life at a quality of life weight of 0.75, then it confers an additional 1.5 QALYs to the patient. The net benefit of intervention A over intervention B is therefore 1.8 - 1.5 = 0.3 QALYs.

The incremental cost-effectiveness ratio (ICER) is the ratio between the difference in costs and the difference in benefits of two interventions. The ICER may be stated as (C1 - C0)/(E1 - E0) in a simple example where C0 and E0 represent the cost and gain, respectively, from taking no health intervention action. C1 and E1 would represent the cost and gain, respectively of taking a specific action. So, an example in which the costs and gains, respectively, are \$140,000 and 3.5 QALYs, would yield a value of \$40,000 per QALY. These values are often used by policy makers and hospital administrators to determine relative priorities when determining treatments for disease conditions. It is important to note that CUA measures relative patient or general population utility of a treatment or pharmacoeconomic intervention. Its results give no absolute indicator of the value of a certain treatment.

The National Institute for Health and Clinical Excellence (NICE) is part of the National Health Service (NHS) in the UK and has been using QALYs to measure the health benefits delivered by various treatment regimens. There is some question as to how well coordinated NICE and NHS are in making decisions about resource allocation. According to a recent study "cost effectiveness often does not appear to be the dominant consideration in decisions about resource allocation made elsewhere in the NHS." While QALYs are used in the United States, they are not utilized to the same degree as they are in Europe.

In the United Kingdom, as of January 2005, the (NICE) is believed to have a threshold of about £30,000 per QALY – roughly twice the mean income after tax – although a formal figure has never been made public Thus, any health intervention which has an incremental cost of more than £30,000 per additional QALY gained is likely to be rejected and any intervention which has an incremental cost of less than or equal to £30,000 per extra QALY gained is likely to be accepted as cost-effective. This implies a value of a full life of about £2.4 million.

In North America, a similar figure of US\$50000 per QALY is often suggested as a threshold ICER for a cost-effective intervention.

A complete compilation of cost–utility analyses in the peer reviewed medical literature is available at the CEA Registry Website

# 3.5.2 Advantages and disadvantages

On the plus side, CUA allows comparison across different health programs and policies by using a common unit of measure (money/QALYs gained). CUA provides a more complete analysis of total benefits than simple cost–benefit analysis does. This is because CUA takes into account the quality of life that an individual has, while CBA does not.

However, in CUA, societal benefits and costs are often not taken into account. Furthermore, some economists believe that measuring QALYs is more difficult than measuring the monetary value of life through health improvements, as is done with cost–benefit analysis. This is because in CUA you need to measure the health improvement effects for every remaining year of life after the program is initiated. While for CBA we have an approximate value of life (\$2 million is one of the estimates), we do not have a QALY estimate for nearly every medical treatment or disease.

In addition, some people believe that life is priceless and there are ethical problems with placing a value on human life.

Also, the weighting of QALYs through time-trade-off, standard gamble, or visual analogue scale is highly subjective.

## 3.5.3 Criticism of cost-utility analysis

There are criticisms of QALY. One involves QALY's lack of usefulness to the healthcare provider in determining the applicability of alternative treatments in the individual patient environment, and the absence of incorporating the patient's willingness to pay (i.e. behavioral economics) in decisions to finance new treatments. Another criticism involves age; elderly individuals are assumed to have lower QALYs since they do not have as many years to influence the calculation of the measurement; so comparing a health intervention's impact on a teenager's QALYs to an older individual's QALYs may

not be considered "fair" since age is such an important factor. Specific health outcomes may also be difficult to quantify, thus making it difficult to compare all factors that may influence an individual's QALY. Example: Comparing an intervention's impact on the livelihood of a single woman to a mother of three; QALYs do not take into account the importance that an individual person may have for others' lives.

In the US, the health care reform law (Patient Protection Affordability and Care Act) has forbidden the use of QALYs "as a threshold to establish what type of health care is cost effective or recommended. Also, "The Secretary shall not utilize such an adjusted life year (or such a similar measure) as a threshold to determine coverage, reimbursement, or incentive programs under title XVIII".

# 3.6 What Prescription Is Required To Value A Medical Practice?

Why does the need to value a medical practice arise? Given that the era of managed healthcare is here, many independent medical practices are probably not going to remain in their present shape and form much longer. When such changes are contemplated or implemented, negotiations between willing buyers and willing sellers must involve the correct value for the practice. If the acquirer is not a medical group, the employees of the practice have to enter into a management contract in which the value of the assets needs to be determined.

Valuation of a medical practice needs to be conducted in accordance with the purpose of the valuation. For example, the methodologies used may differ depending on whether a synergistic buyer looking to expand its operations vertically or horizontally or to merge a current practice with another practice. Similarly, a different method may be best for doctors currently in practice who want to know what their practices are worth?

Valuation of a professional practice is both a science and an art. It is a science because all the tests and procedures have been documented for usual business appraisals. It is an art because valuation of a medical practice is quite different from an ordinary valuation because it involves intangible assets. Intangible assets lend value to a practice, but often questions arise as to whom or what that value is attributable.

## 3.7 Components of Medical Practice Value

One of the first components of determining the value of a medical practice is to determine the economic value of a business as opposed to the book value. Economic value is defined as "that kind of value according to which a thing is capable of producing economic benefits for its owner or user." Depending on the context, economic value is considered equivalent to:

- Fair market value;
- Liquidation value;
- Going concern value;
- Intrinsic value;
- Investment value;
- Replacement value;
- Goodwill value; or
- Insurable value.

There are four main components in the valuation of a medical practice:

# 3.7.1 Tangible Assets

Tangible Assets are items of equipment, cash, accounts receivable and other property that are owned by the practice.

# 3.7.2 Liabilities

Liabilities are debts that the practice has incurred and for which there is a future obligation to pay. Principally, these are accounts payable, accruals or loans. Loans may be secured by real property, life insurance, equipment or accounts receivable or unsecured money loaned to the practice on the personal guarantee of the physicians.

# 3.7.3 **Equity**

Equity is the difference between what a practice owns (its assets) and what it owes (its liabilities). It is the residual value of stock and retained earnings.

# 3.7.4 Intangible Assets

Intangible assets include all the characteristics that contribute to the success of the medical practice — collectively termed "goodwill" or "going concern value." This may include the reputation of the physicians, the location of the practice, the loyalty and volume of high-paying insurance companies and the management systems that contribute to low overhead costs. With the development of managed care and the need for integrated systems, an appraiser must ascertain how much of this goodwill is attributable to personal goodwill and how much to corporate goodwill.

# 3.8 Three Traditional Approaches To Determining Value

The rule of thumb governing the valuation of medical practice is based on the percentage of revenue concept. Briefly, it is equivalent to saying that one dollar in revenue should translate into a specified amount in cents on the bottom line. The various methodologies are:

## **3.8.1**Asset-Based Valuation

Asset-based valuation begins with the construction of an adjusted balance sheet. In fact, with the preponderance of modernized accounting systems, it is easy to determine the book value of the medical practice as of a particular date.

The asset-based valuation should also examine and determine the value of intangible assets. The intangible value may be determined by measuring factors such as reputation, name recognition and location that are difficult to quantify. The value of goodwill may be more consistently and logically determined by examining its effect on profitability and cash flow. The valuation of tangible assets has to be combined with the certain measures of intangible assets to yield a complete picture of the value of the medical practice as a business.

## **3.8.2 Income-Based Valuation**

A popular approach taken by appraisers to value businesses in general is the income-based valuation, in which the appraiser looks at the historical revenue stream and projects future revenue streams to come to

an understanding of value on the basis of future benefits. The net present value of those future benefits can become the basis for an understanding of the fair market value of both tangible and intangible assets.

This method is of greatest relevance when it is clear that the new entity has an opportunity to gain improved revenues because of increasing productivity, decreasing costs or other major value-adding features. The analytical process for determining value through a review of the revenue stream is similar to that which a banker might undertake to ensure that a borrower is credit-worthy. Just as the revenue stream must be sufficient to repay the loan tendered by the bank, so must the revenue stream of a medical practice be sufficient to provide a return on investment to the purchaser of the medical practice being valued.

# 3.8.3 Market Valuation

The third classification builds on the previous two approaches but asks the question: "What's it worth in the market?" The more often such transactions occur in the market, the easier it is to ascertain a ballpark figure for the value of the medical practice. A number of transactions involving either mergers or acquisitions of medical practices are taking place now and data regarding the details of such transactions are more readily available.

## 3.9 The Valuation Process

The best way to understand the valuation process is to look at how to value the various assets and liabilities, and the equity of the practice.

Tangible items, by definition, are the most visible component of a proposed transaction. A physical inventory of all equipment and supplies may be necessary in order to recognize the economic value of the business, in contrast to the book value. Different measurement methods can then be used, including:

## **Depreciated Value**

3.9.1 Depreciated value is the book value of the assets as determined by their purchase price less the accumulated depreciation on them.

## 3.9.2 Replacement Value

Replacement value considers the current cost of replacing all equipment and supplies.

## 3.9.3 Remaining Useful Life Value

This method estimates how long equipment can be expected to last. The remaining useful life of each item of equipment may be estimated by examining the current condition of the equipment, comparing the current condition to that of a comparable item in new condition and estimating how much economic life remains.

## 3.9.4 Market Value

This looks at how much it costs in the open market to purchase and install the equipment being valued. The market value of a particular item of equipment may be higher or lower than the estimate of the remaining useful life may imply. Intangible assets, on the other hand, are more difficult to value. How do you value an asset you can't touch, but you know exists? What independent value does a medical practice have if the revenue stream is intrinsically linked to the personal practice style of the physician?

There are several components to the intangible value of any business, including location, attractiveness to patients, accessibility to new clients, the practice's user-friendliness, the systems that enable it to operate efficiently, the reasons why people keep coming back and the strength of reputation.

Additional components of goodwill also enrich the value of the practice. The financial well being of a practice is enhanced by a payer mix that offers the business owners the stability of a diversified patient base combined with limited contractual discounts. Business success in managed care markets depends on developing systems for tracking referrals and the costs of managing the care of specific patient groups. Increasing the revenue stream in a medical group can come from maintaining a broad array of services that keeps referrals in-house as much as possible. In these components of intangible business value, the attention is on those factors that are transferable to another owner.

If Dr. Smith and Associates Plastic Surgery Center, a reputed medical practice specializing in plastic surgery is being acquired; the value of the name would not be transferable. But if the practice had been named Plastic Surgery Center, then the value of the name would be transferable to the acquirer.

Nontransferable goodwill might include an individual physician's charismatic, extraordinary time management ability, a high profile in the community, or unique medical skill. It is important to distinguish between financial success that comes from corporate goodwill and that which comes from the personal goodwill of the physician.

The traditional techniques designed to be surrogate measurements for the goodwill of a medical practice that comes from establishing and maintaining excellent business systems are:

# 3.9.5 Discounted Cash Flow Analysis

This methodology is based on two key assumptions: The concept that a practice's value is represented by its ability to generate cash flow, which is a mirror of goodwill, and that its future owners are willing to take a measured risk to gain access to that cash flow. They have a certain expectation of gaining a return on their investment. The discounted cash flow analysis process requires estimating both the cash flow and the required rate of return.

## **3.9.6 Capitalization of Earnings**

This method is usually applied to a single variable representing income, such as normalized annual earnings and is applied to historical data rather than to projected income streams. A capitalization rate is any divisor (usually expressed as a percentage) that is used to convert income into value.

## 3.9.7 Guideline Comparison Method

This method is based on the idea that business value is determined by what the market will bear, regardless of an analysis of income streams. The market has the ultimate say over what any given property is worth. If we can only compare the seller's property to that of other recent documented transactions, we will be able to determine the fair market value as only the market can. Data on medical practice acquisitions is provided by three main sources: Goodwill Registry maintained by The Health Care Group of Plymouth Meeting, Pennsylvania; a database maintained by The Institute of Business

Appraisers in Boynton Beach, Florida; and *The 1995 Practice Acquisition Resource Book*, produced by the Center for Healthcare Industry Performance Studies of Columbus, Ohio.

# 3.10 Newer Approaches To Determining Value

The traditional methodologies mentioned above are principally derived from the techniques used to measure goodwill value in small businesses. Their direct application to medical practice valuation, however, requires assumptions about similarities to other businesses that are more difficult to accept.

In December 1995, *American Medical News* reported that "only 17 percent of institutions have posted positive returns on their practice investments." So what went wrong? Was there a problem in the projection of cash flows in the future, or were the discount rates and capitalization rates set erroneously? The answer is probably a combination of both of the above. Therefore, it is probably a pointer to the fact that, given the new wave of mergers and acquisitions, it is time to introduce appraisal techniques for medical practices that fit the environment and contribute to rational deal making.

But first, what is the primary purpose of acquiring a medical practice? It is important to realize that a frequent buyer of medical practices, a healthcare provider organization, anchored by a hospital, isn't really looking to earn a direct return on the investment at all. The real value of owning practices is in realizing a steady stream of business for the hospital and its ancillary services and in becoming a sizable negotiating force with healthcare buyers. Even in mergers of two or more practices, the future benefit isn't in the revenue stream of the acquired practice. It's not even in the opportunity to gain economies of scale and the associated cost reductions.

The real benefit is in the stronger negotiating position that the merged group enjoys. The value of that future benefit lies in the hope that being bigger will translate to getting better, more frequent deals in the managed care market and that the new group will gain momentum to attract more physicians and more capital. These future benefits are what bring potential merger partners to the table.

One crucial factor in determining the fair market value of a medical practice is the interrelated decision about how to compensate physicians after the transaction. Most physicians expect their compensation to remain the same or increase after the transaction, even though they will no longer bear the bulk of the business risk. Paying physicians' salaries and overhead costs in excess of direct proportional fees frequently finds justification in factors that none of the traditional appraisal methods take into consideration. The excess earnings amount to a premium for the acquisition.

Two newer methodologies that reflect a healthy mix of both mathematical modeling and an understanding of ground realities, and are being used by sophisticated financial consultants today to value medical practices are:

## 3.10.1 Replacement Method

A surrogate measure for gauging the business risk associated with a practice is to look at the potential cost of starting that business over again. The replacement method entails three steps:

• Preparing an operating budget for a reasonable period of time, say three years, which would be needed for a practice to reach a stabilized, mature income stream. Financing costs of capital items such as medical and office equipment, leasehold improvements, accounts receivable and working capital must be included;

- Estimating the costs of physician recruitment; and
- Totaling the costs derived from the first two steps.

# 3.10.2 Excess Earnings plus Tangible Assets Method

The historical earnings method calls for an analysis of the historical earnings patterns, and it specifically measures the portion that is above the average for the specialty. The theory behind this method is that only the portion of the physician's income that is above the average income earned by a physician in that profession is attributable to goodwill. Every physician is assumed to be capable of earning a median income within his or her specialty, but only those who have developed ways to leverage their potential earn above-average earnings.

While above-average earnings may be indicators of goodwill, the appraiser must still discern whether the reward was earned because of corporate goodwill, which is transferable to another owner, or personal goodwill, which is not transferable.

The distinction between personal goodwill and institutional goodwill is important in an actual buy and sell transaction in assessing the potential for a successful ownership transition. In certain types of litigation, especially matrimonial litigation, this distinction may not be recognized. A thorough knowledge of case law for the specific jurisdiction is essential.

How does a financial consultant start the work of appraising the value of the medical practice? The due diligence process needs to be completed, through which the buyer obtains the documentation to support the seller's claim about the business.

Among the documents that a seller must make available to a buyer for perusal and the consultant for performing detailed analysis are provider contracts, financial statements, tax records, bank statements, leases on property or equipment, debts or other liabilities of the practice, patient payment records, information about pending or threatened legal action and information about any actions against the practice by regulatory agencies.

# 3.10.3 Mergers and Acquisitions on the Rise

The effects of medical competition are causing physicians to look for help vertically, with hospitals and horizontally with other physicians. As a result of growth in medical groups, physicians now have additional options if they seek to join the mainstream of managed care. These options are exercised in the form of mergers or acquisitions and the appraisal process differs significantly for the two processes. The objective of a valuation of a medical practice in a merger or acquisition is to ensure that the interests of the parties are appropriately determined.

Is a long-term viable proposition for a medical practice a horizontal integration strategy or a vertically integrated organization? The choice depends not only on which one will have greater added value but also on which option the current doctors owning the practice are most comfortable with. Remember, however, that both of these options require a thorough understanding of the purpose of the valuation and the different principles of valuation.

How technically sound must the valuation be? Mathematically sound, it must be backed by down-to-earth evaluations of the results of the techniques applied. Who can perform this task? Only firms that specialize in valuation, who are objective in their approach and who have a vast arsenal of talent and skills to

understand and appreciate the intricacies of each practice on an individual basis are capable of valuing a medical practice correctly.

**Review Questions** 

- 1. Define the Valuation in health?
- 2. Explain the Fair Market Value?
- 3. Explain the CUA in health economics?
- 4. Explain the components of Medical Practice Value?

**Discussion Questions** 

**Discuss the Valuation Process?** 

# Lesson 4 - Externalities in health care

#### Learning Objectives

- To define the Externalities.
- To explain the Negative Externalities and Health Care.
- To explain the positive Externalities and Health Care.
- To describe the Externalities of Medical Supply and Demand.

# 4.1 Externalities

In economics, an externality is an effect from one activity which has consequences for another activity but is not reflected in market prices. Externalities can be either positive, when an external benefit is generated, or negative, when an external cost is generated from a market transaction.

An externality occurs when a decision causes costs or benefits to stakeholders other than the person making the decision, often, though not necessarily, from the use of a public good (for example, a decision which results in pollution of the atmosphere would involve an externality). In other words, the decision-maker does not bear all of the costs or reap all of the gains from his or her action. As a result, in a competitive market too much or too little of the good may be consumed from the point of view of society, depending on incentives at the margin and strategic behavior. If the world around the person making the decision benefits more than she or he does, such as in areas of education, or safety, then the good will be under-provided (or under-consumed); if the costs to the world exceed the costs to the individual making the choice in areas such as pollution or crime then the good will be over-provided from society's point of view. The "point of view" is specified as the greatest maximal utility for society.

This should be contrasted with purely private economic agreements that do not affect third parties, where the assumption may be made that, if each party is acting in his or her own interests (as defined by utility) and there are no other major market failures, the agreement or exchange improves overall utility for society. Put more simply, if an economic transfer between two parties enhances the utility of both without negatively affecting the utility of any third party, the collective utility of society is improved; if the utility of others is harmed, it is no longer unambiguously clear that society's collective utility has increased, and may have decreased.

## 4.2 Background info on Health economics

## 4.2.1 The five health markets typically analyzed are

\* Healthcare Financing market

\* Physician services market

- \* Institutional services market
- \* Input factors market
- \* Professional education market

Topics related to various aspects of health economics include the meaning and measurement of health status, the production of health and health care, the demand for health and health services, health economic evaluation, health insurance, the analysis of health care markets, health care financing, and hospital economics.

# 4.2.2 Example of Healh economics

Although assumptions of textbook models of economic markets apply reasonably well to health care markets, there are important deviations. Insurance markets rely on risk pools, in which relatively healthy enrollees subsidize the care of the rest. Insurers must cope with "adverse selection" which occurs when they are unable to fully predict the medical expenses of enrollees; adverse selection can destroy the risk pool. Features of insurance markets, such as group purchases and preexisting condition exclusions are meant to cope with adverse selection.

Insured patients are naturally less concerned about health care costs than they would if they paid the full price of care. The resulting "moral hazard" drives up costs, as shown by the famous RAND Health Insurance Experiment. Insurers use several techniques to limit the costs of moral hazard, including imposing copayments on patients and limiting physician incentives to provide costly care. Insurers often compete by their choice of service offerings, cost sharing requirements, and limitations on physicians.

Consumers in health care markets often suffer from a lack of adequate information about what services they need to buy and which providers offer the best value proposition. Health economists have documented a problem with "supplier induced demand", whereby providers base treatment recommendations on economic, rather than medical criteria. Researchers have also documented substantial "practice variations", whereby the treatment a patient receives depends as much on which doctor they visit as it does on their condition. Both private insurers and government payers use a variety of controls on service availability to rein in inducement and practice variations.

# 4.3 Negative Externalities and Health Care

Any case for government regulation of the economy ultimately boils down to dealing with unauthorized and unwelcome liability transfer. For example, a factory that heavily pollutes the air and water spreads liability to the community surrounding it. Because the factory isn't the only party that has risk exposure to the pollution it creates, it is ultimately beneficial for the community to redirect all of that liability that the pollution represents back to the factory in the form of regulation.

This is where the government steps in. It can levy taxes on the factory so it can use that money to mitigate the impact of the factory's pollution. Or it can mandate that the factory somehow limit its pollution to levels deemed safe by a credible party. However, sometimes the government can go too far. It can overtax the factory or regulate its operations to the point of infeasibility. And sometimes it's hard to determine the liabilities involved. What is a "safe" level of air and water pollution?

But that's nothing compared to the kind of regulation that befalls the health sector. Possibly the most politically popular provision of the PPACA (aka Obamacare) is that it forces health insurance companies to extend coverage to the insured's dependents as long as they are under the age of 26. Taken in a political vacuum, there is no compelling reason for the government to mandate this provision. But because people think that they won't have to pay for it, they're happy with it.

The two biggest beneficiaries of that rule are the parents (who want to insure their children/dependents) and the children/dependents themselves. Depending on how the rest of the health insurance sector is regulated, the insurance company can either eat the extra cost, pass it to the insured, or pass it its other customers, or some combination of the above.

The arguments for the provision are mostly self serving and wrongheaded. From an actuarial standpoint, it is actually extremely cheap to insure twentysomethings. They are far more healthy than the average American and therefore demand less services from the health sector. So why are they not getting insurance by themselves? There are two big reasons:

- Despite the fact that it's theoretically cheaper to insure a person in their early-mid 20s, individual plans are usually more expensive because a company can deduct health benefits for employees from its tax liability. A family (generally) can't due to rules in the tax code.
- People in their 20s, sensing that they most likely won't need to use health insurance, forgo coverage even though many of them can actually afford it. For this demographic, having an iPhone and a good service plan is more important than health insurance. They might not be entirely wrong.

The biggest portion of the PPACA is focused on getting 30+ million uninsured people insured. The vast majority of these people are either poor, young, or both. Because most insurance markets don't allow insurance companies to price discriminate based on age, young people are essentially going to be forced to subsidize old people and poor people.

It's also likely that those already insured will also see a deterioration of their own insurance plans either through benefits reduction or by virtue of an overloaded health sector. Come 2014, we'll add 30 million to the insurance rolls but we won't have a commensurate increase in health providers. So what exactly is the net benefit here? Poor people can have subsidized insurance. But the cost is trickier to calculate.

When the PPACA passed, Democrats hailed it as landmark legislation that would help people and tamp down health inflation. We will be very surprised if it does the latter. In the rush to "do something", it is highly possible that the Federal government may have done something for the worse. Sometimes it's possible for a government, so focused on the negative externalities caused by the private sector, to create negative externalities by its regulation.

# 4.4 Health care - positive externalities

That basic health care is a public good and provides considerable positive externalities, and will therefore have to be supplied by the government is widely accepted. Now here comes more examples of its positive externalities.

A CEPR study which finds that small business activity to be marginal in the US, considered the home of entrepreneurial capitalism, has provoked various explanations for the surprising finding, prominent being the role of high health care costs in the US.



Self-employment Rate, 2007

About the reasons for the low self-employment rates in the US, the study writes,

"One plausible explanation for the consistently higher shares of self-employment and smallbusiness employment in the rest of the world's rich economies is that all have some form of universal access to health care. The high cost to self-employed workers and small businesses of the private, employer-based health-care system in place in the United States may act as a significant deterrent to small start-up companies,12 an experience not shared by entrepreneurs in countries with universal access to health care."

Paul Krugman makes this interesting punch line, "We're not independent free spirits; on the contrary, we're more likely than Europeans to be cubicle rats working for big employers." NYT has this op-ed which makes the case for universal health care and its importance in lowering costs for small businesses. The reforms proposed by the Obama administration like the setting up of health insurance exchanges would enable smaller firms to buy helth insurance plans for their employees at the same cost as larger firms.

Contrast this low level of small business activity in the US with India, whose cities have been found to be teeming with entrepreneurial spirit. Interestingly, here too the absence of additional health care costs for their employees may also be an important contributing factor to the proliferation of small businesses. However, in this case, the government is not bearing the health care burden and there is no clear and enforceable mandate on the employees to do so. In the circumstances, the workers are left to fend for themselves, with profoundly adverse implications for the society and economy as a whole.

# 4.5 Externalities of Medical Supply and Demand

It is well known that traditional medical marketplace supply and demand structures are not necessarily efficient or timely. This is particularly true in healthcare delivery and is attributed to various "externalities" that seemingly deter competition.

# 4.5.1 Medical Externalities

Pertinent externalities for the physician, and healthcare practitioner, include but are not limited, to the following:

**4.5.1. 1 Barriers to Entry:** Physicians and other "learned healthcare professionals", receive an extended formal education. This not only ensures competence and protects the public, but it also reduces competition.

**4.5.1.2 Competitive Advantage:** Once school is over, a medical degree is an effective strategic advantage over a non-degreed practitioner.

**4.5.1.3 Monopsony and Oligopsony**: Occur when discounts are extracted from healthcare providers because of supply and demand size inequalities, and may run afoul of anti-trust laws.

**4.5.1.4 Barriers to Exit:** The increased cost of "doing business", effectively precludes many physicians from terminating practice unit all fiscal investments are recouped. Observe that few doctors can practice "part time" and still afford their overhead.

**4.5.1.5 Mortal turpitude:** Since physicians take the "Hippocratic Oath", they are expected to place patient welfare above their own. This is not necessarily true with business entities that must adhere to legalities only.

**4.5.1.6. Moral Hazards:** All know that cigarettes, dietary indiscretions, drinking, drug use and promiscuous behavior are unhealthy. Yet, many pursue this life-style that drive up healthcare costs for society as a whole.

# 4.5.2 Other Externalities Exist

Other externalities that drive up the cost of healthcare are well known but not easily changed.

First, most Americans have group insurance through their employment. They do not "purchase" it on the open market, making them fairly indifferent to the costs or needs of individual health care purchases.

Second, acquiring health insurance is not like buying a commodity, and it is difficult for a layman to know what purchases make sense and at what price?

Third, most health insurance purchasing decisions are made by the doctor (i.e., refer to a specialist or have surgery), not the patient consumer, and hence has a vested interest in increasing service demand. This is changing with the consumer directed healthcare plan movement.

Lastly, what well informed person would be a tough bargainer when their health is at stake? Who is going to negotiate with a neuro-surgeon? Nevertheless, some patients are doing just that with HD-HCPs!

## 4.5.3 The Golden Age of Medical Reimbursement

During the so called "*Golden Age of Medicine*", 1965-1990, Medicare, Medicaid and all these factors worked to isolate American medicine from financial reality.

In the last decade, however, the private sector has demanded cost containment by negotiate prices for medical services.

## **Review Questions**

- 1. Define the Externalities?
- 2. Explain the Negative Externalities and Health Care?
- 3. Explain the Positive Externalities and Health Care?
- 4. Explain the Externalities of Medical Supply and Demand?

#### **Discussion Questions**

Discuss the Negative and Positive Externalities in Health Care?

# Market analysis

# Lesson 1 – Market configuration

## Learning Objectives

- To define the Market configuration.
- To explain the Market segmentation.
- To explain the elements of Market configuration.
- To describe the Bases for Segmentation in Consumer Markets.

# 1.1 Market configuration

A **market analysis** studies the attractiveness and the dynamics of a special market within a special industry. It is part of the industry analysis and this in turn of the global environmental analysis. Through all of these analyses the opportunities, strengths, weaknesses and threats of a company can be identified. Finally, with the help of a SWOT analysis, adequate business strategies of a company will be defined. The market analysis is also known as a documented investigation of a market that is used to inform a firm's planning activities, particularly around decisions of inventory, purchase, work force expansion/contraction, facility expansion, purchases of capital equipment, promotional activities, and many other aspects of a company.

## **1.2 Market segmentation**

Market segmentation is the basis for a differentiated market analysis. Differentiation is important. One main reason is the saturation of consumption, which exists due to the increasing competition in offered products. Consumers ask for more individual products and services and are better informed about the range of products than before. As a consequence, market segmentation is indispensable. Segmentation includes a lot of market research, since a lot of market knowledge is required to segment the market. Market research about market structures and processes must be done to define the "relevant market". The relevant market is an integral part of the whole market, on which the company focuses its activities. To identify and classify the relevant market, a market classification or segmentation has to be done.

# 1.3 Dimensions of market analysis

David A. Aaker outlined the following dimensions of a market analysis:

- Market size (current and future)
- Market Trend
- Market growth rate
- Market profitability
- Industry cost structure
- Distribution channels
- Key success factors

• Key success Details

The goal of a market analysis is to determine the attractiveness of a market, both now and in the future. Organizations evaluate the future attractiveness of a market by gaining an understanding of evolving opportunities and threats as they relate to that organization's own strengths and weaknesses.

Organizations use the finding to guide the investment decisions they make to advance their success. The findings of a market analysis may motivate an organization to change various aspects of its investment strategy. Affected areas may include inventory levels, a work force expansion/contraction, facility expansion, purchases of capital equipment, and promotional activities.

# **1.4 Elements**

# 1.4.1 Market size

The market size is defined through the market volume and the market potential. The market volume exhibits the totality of all realized sales volume of a special market. The volume is therefore dependent on the quantity of consumers and their ordinary demand. Furthermore, the market volume is either measured in quantities or qualities. The quantities can be given in technical terms, like GW for power capacities, or in numbers of items. Qualitative measuring mostly uses the sales turnover as an indicator. That means that the market price and the quantity are taken into account. Besides the market volume, the market potential is of equal importance. It defines the upper limit of the total demand and takes potential clients into consideration. Although the market potential is rather fictitious, it offers good values of orientation. The relation of market volume to market potential provides information about the chances of market growth. The following are examples of information sources for determining market size:

- Government data
- Trade association data
- Financial data from major players
- Customer surveys

## 1.4.2 Market trends

Market trends are the upward or downward movement of a market, during a period of time. The market size is more difficult to estimate if one is starting with something completely new. In this case, you will have to derive the figures from the number of potential customers, or customer segments.

Besides information about the target market, one also needs information about one's competitors, customers, products, etc. Lastly, you need to measure marketing effectiveness. A few techniques are:

- Customer analysis
- Choice modelling
- Competitor analysis
- Risk analysis
- Product research
- Advertising the research
- Marketing mix modeling
- Simulated Test Marketing

Changes in the market are important because they often are the source of new opportunities and threats. Moreover, they have the potential to dramatically affect the market size.

Examples include changes in economic, social, regulatory, legal, and political conditions and in available technology, price sensitivity, demand for variety, and level of emphasis on service and support.

# 1.4.3 Market growth rate

A simple means of forecasting the market growth rate is to extrapolate historical data into the future. While this method may provide a first-order estimate, it does not predict important turning points. A better method is to study market trends and sales growth in complementary products. Such drivers serve as leading indicators that are more accurate than simply extrapolating historical data.

Important inflection points in the market growth rate sometimes can be predicted by constructing a product diffusion curve. The shape of the curve can be estimated by studying the characteristics of the adoption rate of a similar product in the past.

Ultimately, many markets mature and decline. Some leading indicators of a market's decline include market saturation, the emergence of substitute products, and/or the absence of growth drivers.

## **1.4.4 Market opportunity**

A market opportunity product or a service, based on either one technology or several, fulfills the need(s) of a (preferably increasing) market better than the competition and better than substitution-technologies within the given environmental frame (e.g. society, politics, legislation, etc.).

## **1.4.5 Market profitability**

While different organizations in a market will have different levels of profitability, they are all similar to different market conditions. Michael Porter devised a useful framework for evaluating the attractiveness of an industry or market. This framework, known as Porter five forces analysis, identifies five factors that influence the market profitability:

- Buyer power
- Supplier power
- Barriers to entry
- Threat of substitute products
- Rivalry among firms in the industry

## **1.4.6 Industry cost structure**

The cost structure is important for identifying key factors for success. To this end, Porter's value chain model is useful for determining where value is added and for isolating the costs.

The cost structure also is helpful for formulating strategies to develop a competitive advantage. For example, in some environments the experience curve effect can be used to develop a cost advantage over competitors.

# **1.4.7 Distribution channels**

Examining the following aspects of the distribution system may help with a market analysis:

- Existing distribution channels can be described by how direct they are to the customer.
- Trends and emerging channels new channels can offer the opportunity to develop a competitive advantage.
- Channel power structure for example, in the case of a product having little brand equity, retailers have negotiating power over manufacturers and can capture more margin.

# **1.4.8 Success factors**

The key success factors are those elements that are necessary in order for the firm to achieve its marketing objectives. A few examples of such factors include:

- Access to essential unique resources
- Ability to achieve economies of scale
- Access to distribution channels
- Technological progress

It is important to consider that key success factors may change over time, especially as the product progresses through its life cycle.

## **1.4.9** Applications

The literature defines several areas in which market analysis is important. These include: sales forecasting, market research, and marketing strategy. Not all managers will need to conduct a market analysis. Nevertheless, it would be important for managers that use market analysis data to know how analysts derive their conclusions and what techniques they use to do so.

# 1.5 The Need for Market Segmentation

The marketing concept calls for understanding customers and satisfying their needs better than the competition. But different customers have different needs, and it rarely is possible to satisfy all customers by treating them alike.

*Mass marketing* refers to treatment of the market as a homogenous group and offering the same marketing mix to all customers. Mass marketing allows economies of scale to be realized through mass production, mass distribution, and mass communication. The drawback of mass marketing is that customer needs and preferences differ and the same offering is unlikely to be viewed as optimal by all customers. If firms ignored the differing customer needs, another firm likely would enter the market with a product that serves a specific group, and the incumbant firms would lose those customers.

*Target marketing* on the other hand recognizes the diversity of customers and does not try to please all of them with the same offering. The first step in target marketing is to identify different market segments and their needs.

# 1.6 Requirements of Market Segments

In addition to having different needs, for segments to be practical they should be evaluated against the following criteria:

- Identifiable: the differentiating attributes of the segments must be measurable so that they can be identified.
- Accessible: the segments must be reachable through communication and distribution channels.
- Substantial: the segments should be sufficiently large to justify the resources required to target them.
- Unique needs: to justify separate offerings, the segments must respond differently to the different marketing mixes.
- Durable: the segments should be relatively stable to minimize the cost of frequent changes.

A good market segmentation will result in segment members that are internally homogenous and externally heterogeneous; that is, as similar as possible within the segment, and as different as possible between segments.

# 1.7 Bases for Segmentation in Consumer Markets

Consumer markets can be segmented on the following customer characteristics.

- Geographic
- Demographic
- Psychographic
- Behavioralistic

## **1.7.1 Geographic Segmentation**

The following are some examples of geographic variables often used in segmentation.

- Region: by continent, country, state, or even neighborhood
- Size of metropolitan area: segmented according to size of population
- Population density: often classified as urban, suburban, or rural
- Climate: according to weather patterns common to certain geographic regions

## **1.7.2 Demographic Segmentation**

Some demographic segmentation variables include:

- Age
- Gender
- Family size
- Family lifecycle
- Generation: baby-boomers, Generation X, etc.
- Income
- Occupation
- Education
- Ethnicity

- Nationality
- Religion
- Social class

Many of these variables have standard categories for their values. For example, family lifecycle often is expressed as bachelor, married with no children (DINKS: Double Income, No Kids), full-nest, empty-nest, or solitary survivor. Some of these categories have several stages, for example, full-nest I, II, or III depending on the age of the children.

# 1.7.3 Psychographic Segmentation

Psychographic segmentation groups customers according to their lifestyle. Activities, interests, and opinions (AIO) surveys are one tool for measuring lifestyle. Some psychographic variables include:

- Activities
- Interests
- Opinions
- Attitudes
- Values

## 1.7.4 Behavioralistic Segmentation

Behavioral segmentation is based on actual customer behavior toward products. Some behavioralistic variables include:

- Benefits sought
- Usage rate
- Brand loyalty
- User status: potential, first-time, regular, etc.
- Readiness to buy
- Occasions: holidays and events that stimulate purchases

Behavioral segmentation has the advantage of using variables that are closely related to the product itself. It is a fairly direct starting point for market segmentation.

## 1.8 Bases for Segmentation in Industrial Markets

In contrast to consumers, industrial customers tend to be fewer in number and purchase larger quantities. They evaluate offerings in more detail, and the decision process usually involves more than one person. These characteristics apply to organizations such as manufacturers and service providers, as well as resellers, governments, and institutions.

Many of the consumer market segmentation variables can be applied to industrial markets. Industrial markets might be segmented on characteristics such as:

- Location
- Company type
- Behavioral characteristics

## 1.8.1 Location

In industrial markets, customer location may be important in some cases. Shipping costs may be a purchase factor for vendor selection for products having a high bulk to value ratio, so distance from the vendor may be critical. In some industries firms tend to cluster together geographically and therefore may have similar needs within a region.

#### **1.8.2** Company Type

Business customers can be classified according to type as follows:

- Company size
- Industry
- Decision making unit
- Purchase Criteria

## **1.8.3 Behavioral Characteristics**

In industrial markets, patterns of purchase behavior can be a basis for segmentation. Such behavioral characteristics may include:

- Usage rate
- Buying status: potential, first-time, regular, etc.
- Purchase procedure: sealed bids, negotiations, etc.

#### **Review Questions**

- 1. Define the Market configuration?
- 2. Explain the Market segmentation?
- 3. Explain the elements of Market configuration?
- 4. Explain the Bases for Segmentation in Consumer Markets?

**Discussion Questions** 

Discuss the Market segmentation and configuration in detail?

# Lesson 2 – Price determination under different market conditions

#### Learning Objectives

- To define the Pricing Strategy.
- To explain the Marketing Strategy and the Marketing Mix.
- To explain the Pricing Objectives.
- To describe the Price Determination Under Monopolistic Competition.

# **2.1 Pricing Strategy**

One of the four major elements of the marketing mix is price. Pricing is an important strategic issue because it is related to product positioning. Furthermore, pricing affects other marketing mix elements such as product features, channel decisions, and promotion.

While there is no single recipe to determine pricing, the following is a general sequence of steps that might be followed for developing the pricing of a new product:

- 1. **Develop marketing strategy** perform marketing analysis, segmentation, targeting, and positioning.
- 2. Make marketing mix decisions define the product, distribution, and promotional tactics.
- 3. Estimate the demand curve understand how quantity demanded varies with price.
- 4. **Calculate cost** include fixed and variable costs associated with the product.
- 5. **Understand environmental factors** evaluate likely competitor actions, understand legal constraints, etc.
- 6. **Set pricing objectives** for example, profit maximization, revenue maximization, or price stabilization (status quo).
- 7. **Determine pricing** using information collected in the above steps, select a pricing method, develop the pricing structure, and define discounts.

These steps are interrelated and are not necessarily performed in the above order. Nonetheless, the above list serves to present a starting framework.

## 2.2 Marketing Strategy and the Marketing Mix

Before the product is developed, the marketing strategy is formulated, including target market selection and product positioning. There usually is a tradeoff between product quality and price, so price is an important variable in positioning.

Because of inherent tradeoffs between marketing mix elements, pricing will depend on other product, distribution, and promotion decisions.

# 2.3 Estimate the Demand Curve

Because there is a relationship between price and quantity demanded, it is important to understand the impact of pricing on sales by estimating the demand curve for the product.

For existing products, experiments can be performed at prices above and below the current price in order to determine the price elasticity of demand. Inelastic demand indicates that price increases might be feasible.

# 2.4 Calculate Costs

If the firm has decided to launch the product, there likely is at least a basic understanding of the costs involved, otherwise, there might be no profit to be made. The unit cost of the product sets the lower limit of what the firm might charge, and determines the profit margin at higher prices.

The total unit cost of a producing a product is composed of the variable cost of producing each additional unit and fixed costs that are incurred regardless of the quantity produced. The pricing policy should consider both types of costs.

# 2.5 Environmental Factors

Pricing must take into account the competitive and legal environment in which the company operates. From a competitive standpoint, the firm must consider the implications of its pricing on the pricing decisions of competitors. For example, setting the price too low may risk a price war that may not be in the best interest of either side. Setting the price too high may attract a large number of competitors who want to share in the profits.

From a legal standpoint, a firm is not free to price its products at any level it chooses. For example, there may be price controls that prohibit pricing a product too high. Pricing it too low may be considered predatory pricing or "dumping" in the case of international trade. Offering a different price for different consumers may violate laws against price discrimination. Finally, collusion with competitors to fix prices at an agreed level is illegal in many countries.

# 2.6 Pricing Objectives

The firm's pricing objectives must be identified in order to determine the optimal pricing. Common objectives include the following:

- **Current profit maximization** seeks to maximize current profit, taking into account revenue and costs. Current profit maximization may not be the best objective if it results in lower long-term profits.
- **Current revenue maximization** seeks to maximize current revenue with no regard to profit margins. The underlying objective often is to maximize long-term profits by increasing market share and lowering costs.
- **Maximize quantity** seeks to maximize the number of units sold or the number of customers served in order to decrease long-term costs as predicted by the experience curve.
- **Maximize profit margin** attempts to maximize the unit profit margin, recognizing that quantities will be low.

- **Quality leadership** use price to signal high quality in an attempt to position the product as the quality leader.
- **Partial cost recovery** an organization that has other revenue sources may seek only partial cost recovery.
- **Survival** in situations such as market decline and overcapacity, the goal may be to select a price that will cover costs and permit the firm to remain in the market. In this case, survival may take a priority over profits, so this objective is considered temporary.
- **Status quo** the firm may seek price stabilization in order to avoid price wars and maintain a moderate but stable level of profit.

For new products, the pricing objective often is either to maximize profit margin or to maximize quantity (market share). To meet these objectives, skim pricing and penetration pricing strategies often are employed.

# 2.6.1 Skim pricing

**Skim pricing** attempts to "skim the cream" off the top of the market by setting a high price and selling to those customers who are less price sensitive. Skimming is a strategy used to pursue the objective of profit margin maximization.

Skimming is most appropriate when:

- Demand is expected to be relatively inelastic; that is, the customers are not highly price sensitive.
- Large cost savings are not expected at high volumes, or it is difficult to predict the cost savings that would be achieved at high volume.
- The company does not have the resources to finance the large capital expenditures necessary for high volume production with initially low profit margins.

# 2.6.2 Penetration pricing

**Penetration pricing** pursues the objective of quantity maximization by means of a low price. It is most appropriate when:

- Demand is expected to be highly elastic; that is, customers are price sensitive and the quantity demanded will increase significantly as price declines.
- Large decreases in cost are expected as cumulative volume increases.
- The product is of the nature of something that can gain mass appeal fairly quickly.
- There is a threat of impending competition.

As the product lifecycle progresses, there likely will be changes in the demand curve and costs. As such, the pricing policy should be reevaluated over time.

The pricing objective depends on many factors including production cost, existence of economies of scale, barriers to entry, product differentiation, rate of product diffusion, the firm's resources, and the product's anticipated price elasticity of demand.

# 2.7 Pricing Methods

To set the specific price level that achieves their pricing objectives, managers may make use of several pricing methods. These methods include:

- **Cost-plus pricing** set the price at the production cost plus a certain profit margin.
- **Target return pricing** set the price to achieve a target return-on-investment.
- **Value-based pricing** base the price on the effective value to the customer relative to alternative products.
- **Psychological pricing** base the price on factors such as signals of product quality, popular price points, and what the consumer perceives to be fair.

In addition to setting the price level, managers have the opportunity to design innovative pricing models that better meet the needs of both the firm and its customers. For example, software traditionally was purchased as a product in which customers made a one-time payment and then owned a perpetual license to the software. Many software suppliers have changed their pricing to a subscription model in which the customer subscribes for a set period of time, such as one year. Afterwards, the subscription must be renewed or the software no longer will function. This model offers stability to both the supplier and the customer since it reduces the large swings in software investment cycles.

# 2.8 Price Discounts

The normally quoted price to end users is known as the *list price*. This price usually is discounted for distribution channel members and some end users. There are several types of discounts, as outlined below.

- Quantity discount offered to customers who purchase in large quantities.
- **Cumulative quantity discount** a discount that increases as the cumulative quantity increases. Cumulative discounts may be offered to resellers who purchase large quantities over time but who do not wish to place large individual orders.
- Seasonal discount based on the time that the purchase is made and designed to reduce seasonal variation in sales. For example, the travel industry offers much lower off-season rates. Such discounts do not have to be based on time of the year; they also can be based on day of the week or time of the day, such as pricing offered by long distance and wireless service providers.
- Cash discount extended to customers who pay their bill before a specified date.
- **Trade discount** a functional discount offered to channel members for performing their roles. For example, a trade discount may be offered to a small retailer who may not purchase in quantity but nonetheless performs the important retail function.
- **Promotional discount** a short-term discounted price offered to stimulate sales.

# 2.9 Price Determination Under Monopolistic Competition

In the time of inflation, to determine selling price is one of main challenge for a manager because today real market is of monopolistic competition. A little mistake can be loss of big number of customers. So, it is the duty of manager to get the advice of cost accountant, management accountant and economists of finance department. Economist thinks different factors instead of just seeing historical accounting data. He analyzes the the total quantity of demand and supply and tries to see its effect in monopolistic.

In monopolistic competition, we can divide market on the basis of product differentiation. It is situation in which there are lots of seller and lots of buyer. But they do not sell same product. Every seller's product will be different on the basis of quality, brand or trade mark. So, in this market, both **monopoly** and **perfect market's** feature will be exist. Every seller will take different price for his product. But seller will also try to get best price than other competitors of market. That is the reason, in this market, price will not be fixed at the equal point of quantity demanded and quantity supplied. Price will be determined at the point where marginal revenue is equal to marginal cost. Economist gets the help of cost accountant for getting all past and relevant data relating to marginal cost, average cost, fixed cost and average variable cost. I have already explained all these concepts in cost accounting when

1st Condition = Marginal Revenue will be equal to Marginal Cost

**2nd Condition** = Marginal cost curve cuts marginal revenue curve from below.

At that time, company will get following things :

# 2.9.1 1st : Company will get Super Profit

Economist will advice that company will get super profit if he will see the average cost curve below the the average revenue curve. We know that super profit value will be calculated on the basis the excess of average revenue over average cost.

# 2.9.2 2nd Company will get Normal Profit

Economist will advice that company will get normal profit if he will see that the average cost curve is touching average revenue curve. At that time, we will have to survive because our both fixed cost and variable cost are getting from sale of products. So, there is no need to worry at that point.

# 2.9.3 3rd Company will get Minimum Loss

Economist will advice that company will face minimum loss of fixed cost due to less demand and over production. He can give this report after seeing average cost curve above the average revenue curve. If he will deeply study, he will find that at this point, company will receive average variable cost from his average revenue because average revenue will equal to average variable cost.

Above three situation may be of his performance but equilibrium must be at the point where company's marginal cost will equal to marginal revenue. Following presentation will be helpful to learn this concept deeply.



# **Review Questions**

- 5. Define the Pricing Strategy?
- 6. Explain the Marketing Strategy and the Marketing Mix?
- 7. Explain the Pricing Objectives?
- 8. Explain the Price Determination Under Monopolistic Competition?

**Discussion Questions** 

Discuss the methods of price determination?

## Lesson 3 - Nature and characteristics of health care markets

Learning Objectives

- To define the Health economics.
- To explain the Health care demand.
- To discuss the Indian Healthcare Sector.
- To describe the Risk and Insurance in Healthcare Sector.

#### 3.1 Health economics

**Health economics** is a branch of economics concerned with issues related to efficiency, effectiveness, value and behavior in the production and consumption of health and health care. In broad terms, health economists study the functioning of the health care systems as well as health-affecting behaviors such as smoking.

A seminal 1963 article by Kenneth Arrow, often credited with giving rise to the health economics as a discipline, drew conceptual distinctions between health and other goods. Factors that distinguish health economics from other areas include extensive government intervention, intractable uncertainty in several dimensions, asymmetric information, barriers to entry, externalities and the presence of a third-party agent. In healthcare, the third-party agent is the physician, who makes purchasing decisions (e.g., whether to order a lab test, prescribe a medication, perform a surgery, etc.) while being insulated from the price of the product or service.

Health economists evaluate multiple types of financial information: costs, charges and expenditures.

Uncertainty is intrinsic to health, both in patient outcomes and financial concerns. The knowledge gap that exists between a physician and a patient creates a situation of distinct advantage for the physician, which is called asymmetric information.

Externalities arise frequently when considering health and health care, notably in the context of infectious disease. For example, making an effort to avoid catching the common cold affects people other than the decision maker.

## 3.1.1 Scope

The scope of health economics is neatly encapsulated by Alan Williams' "plumbing diagram" dividing the discipline into eight distinct topics:

- What influences health? (other than health care)
- What is health and what is its value
- The demand for health care
- The supply of health care
- Micro-economic evaluation at treatment level
- Market equilibrium
- Evaluation at whole system level; and,
- Planning, budgeting and monitoring mechanisms.



## 3.2 Health care demand

The demand for health care is a derived demand from the demand for health. Health care is demanded as a means for consumers to achieve a larger stock of "health capital." The demand for health is unlike most other goods because individuals allocate resources in order to both consume and produce health.

The above description gives three roles of persons in health economics. The World Health Report (p. 52) states that people take four roles in the health care: 1. Contributors 2. Citizens (stewardship) 3. Providers 4. Consumers

Michael Grossman's 1972 model of health production has been extremely influential in this field of study and has several unique elements that make it notable. Grossman's model views each individual as both a producer and a consumer of health. Health is treated as a stock which degrades over time in the absence of "investments" in health, so that health is viewed as a sort of capital. The model acknowledges that health is both a consumption good that yields direct satisfaction and utility, and an investment good, which yields satisfaction to consumers indirectly through increased productivity, fewer sick days, and higher wages. Investment in health is costly as consumers must trade off time and resources devoted to health, such as exercising at a local gym, against other goals. These factors are used to determine the optimal level of health that an individual will demand. The model makes predictions over the effects of changes in prices of health care and other goods, labour market outcomes such as employment and wages, and technological changes. These predictions and other predictions from models extending Grossman's 1972 paper form the basis of much of the econometric research conducted by health economists.

In Grossman's model, the optimal level of investment in health occurs where the marginal cost of health capital is equal to the marginal benefit. With the passing of time, health depreciates at some rate  $\delta$ . The interest rate faced by the consumer is denoted by r. The marginal cost of health capital can be found by adding these variables:  $MC_{HK} = r + \delta$ . The marginal benefit of health capital is the rate of return from this capital in both market and non-market sectors. In this model, the optimal health stock can be impacted by factors like age, wages and education. As an example,  $\delta$  increases with age, so it becomes more and more costly to attain the same level of health capital or health stock as one ages. Age also decreases the marginal benefit of health stock. The optimal health stock will therefore decrease as one ages.

Beyond issues of the fundamental, "real" demand for medical care derived from the desire to have good health (and thus influenced by the production function for health) is the important distinction between the "marginal benefit" of medical care (which is always associated with this "real demand" curve based on derived demand), and a separate "effective demand" curve, which summarizes the amount of medical care demanded at particular market prices. Because most medical care is not purchased from providers directly, but is rather obtained at subsidized prices due to insurance, the out-of-pocket prices faced by consumers are typically much lower than the market price. The consumer sets MB=MC out of pocket, and so the "effective demand" will have a separate relationship between price and quantity than will the "marginal benefit curve" or real demand relationship. This distinction is often described under the rubric of "ex-post moral hazard" (which is again distinct from ex-ante moral hazard, which is found in any type of market with insurance).

## 3.3 Economic Evaluation in Germany and in the United Kingdom

A large focus of health economics, is the microeconomic evaluation of the value of individual treatments. The states in Europe appraise certain new and existing pharmaceuticals and devices using economic evaluations by health technology assessments by different national institutions. In Europe's largest health market Germany the Institute for Quality and Economy in Health Services (Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen — IQWiG) is responsible, while it is the National Institute for Health and Clinical Excellence NICE in the United Kingdom.

Economic evaluation is the comparison of two or more alternative courses of action in terms of both their costs and consequences (Drummond et al.). Economists usually distinguish several types of economic evaluation, differing in how consequences are measured:

- Cost-minimization analysis
- Cost benefit analysis
- Cost-effectiveness analysis
- Cost-utility analysis

In cost minimization analysis (CMA), the effectiveness of the comparators in question must be proven to be equivalent. The 'cost-effective' comparator is simply the one which costs less (as it achieves the same outcome). In cost-benefit analysis (CBA), costs and benefits are both valued in cash terms. Cost effectiveness analysis (CEA) measures outcomes in 'natural units', such as mmHg, symptom free days, life years gained. Finally cost-utility analysis (CUA) measures outcomes in a composite metric of both length and quality of life, the Quality-adjusted life year (QALY). (Note there is some international variation in the precise definitions of each type of analysis).

A final approach which is sometimes classed an economic evaluation is a cost of illness study. This is not a true economic evaluation as it does not compare the costs and outcomes of alternative courses of action. Instead, it attempts to measure all the costs associated with a particular disease or condition. These will include direct costs (where money actually changes hands, e.g. health service use, patient co-payments and out of pocket expenses), indirect costs (the value of lost productivity from time off work due to illness), and intangible costs (the 'disvalue' to an individual of pain and suffering). (Note specific definitions in health economics may vary slightly from other branches of economics.)

## 3.4 Market equilibrium

## 3.4.1 The five health markets typically analyzed are

- Health care financing market
- Physician and nurses services market
- Institutional services market
- Input factors market
- Professional education market

Although assumptions of textbook models of economic markets apply reasonably well to health care markets, there are important deviations. Many states have created risk pools in which relatively healthy enrollees subsidise the care of the rest. Insurers must cope with adverse selection which occurs when they are unable to fully predict the medical expenses of enrollees; adverse selection can destroy the risk pool. Features of insurance market risk pools, such as group purchases, preferential selection ("cherry-picking"), and preexisting condition exclusions are meant to cope with adverse selection.

Insured patients are naturally less concerned about health care costs than they would if they paid the full price of care. The resulting moral hazard drives up costs, as shown by the famous RAND Health Insurance Experiment. Insurers use several techniques to limit the costs of moral hazard, including imposing copayments on patients and limiting physician incentives to provide costly care. Insurers often compete by their choice of service offerings, cost sharing requirements, and limitations on physicians.

Consumers in health care markets often suffer from a lack of adequate information about what services they need to buy and which providers offer the best value proposition. Health economists have

documented a problem with supplier induced demand, whereby providers base treatment recommendations on economic, rather than medical criteria. Researchers have also documented substantial "practice variations", whereby the treatment aols on service availability to rein in inducement and practice variations.

The U.S. health care market has relied extensively on competition to control costs and improve quality. Critics question whether problems with adverse selection, moral hazard, information asymmetries, demand inducement, and practice variations can be addressed by private markets. Competition has fostered reductions in prices, but consolidation by providers and, to a lesser extent, insurers, has tempered this effect.

Though the market for health care in the U.S. is primarily coordinated by competition, there is an abundance of regulations that inhibit market efficiency. A classic example is medical licenses. Some economists argue that requiring doctors to have a medical license constrains inputs, inhibits innovation, and increases cost to consumers while largely only benefiting the doctors themselves.

# 3.4.2 Competitive equilibrium in the five health markets

While the nature of health care as a private good is preserved in the last three markets, market failures occur in the financing and delivery markets due to two reasons: (1) Perfect information about price products is not a viable assumption (2) Various barriers of entry exist in the financing markets (i.e. monopoly formations in the insurance industry)

# 3.4.3 Ideological bias in the debate about the financing and delivery health markets

The health care debate in public policy is often informed by ideology and not sound economic theory. Often, politicians subscribe to a moral order system or belief about the role of governments in public life that guides biases towards provision of health care as well. The ideological spectrum spans: individual savings accounts and catastrophic coverage, tax credit or voucher programs combined with group purchasing arrangements, and expansions of public-sector health insurance. These approaches are advocated by health care conservatives, moderates and liberals, respectively.

# 3.5 Other issues

## 3.5 .1 Medical economics

Often used synonymously with Health Economics, *Medical economics*, according to Culyer, is the branch of economics concerned with the application of economic theory to phenomena and problems associated typically with the second and third health market outlined above. Typically, however, it pertains to cost-benefit analysis of pharmaceutical products and cost-effectiveness of various medical treatments. Medical economics often uses mathematical models to synthesise data from biostatistics and epidemiology for support of medical decision making, both for individuals and for wider health policy.

## 3.5.2 Behavioral economics

Peter Orszag has suggested that behavioral economics is an important factor for improving the health care system, but that relatively little progress has been made when compared to retirement policy.<sup>[12]</sup>

## 3.5.3 Mental Health Economics

Mental health economics incorporates a vast array of subject matters, ranging from pharmacoeconomics to labor and welfare economics. Mental health can be directly related to economics by the potential of affected individuals to contribute as human capital. In 2009 Currie and Stabile published "Mental Health in Childhood and Human Capital" in which they assessed how common childhood mental health problems may alter the human capital accumulation of affected children. Externalities may include the influence that affected individuals have on surrounding human capital, such as at the workplace or in the home. In turn, the economy also affects the individual, particularly in light of globalization. For example, studies in India, where there is an increasingly high occurrence of western outsourcing, have demonstrated a growing hybrid identity in young professionals who face very different sociocultural expectations at the workplace and in at home.

Mental health economics presents a unique set of challenges to researchers. In health economics, the health status of an individual may be given a value such as HYE (Health Year Equivalents); however, in mental health economics, valuations may not be the same for affected individuals. For instance a suicidal individual may place higher utility on death than life. Additionally, individuals with cognitive disabilities may not be able to communicate preferences. These factors represent challenges in terms of placing value on the mental health status of an individual, especially in relation to the individual's potential as human capital. Further, employment statistics are often used in mental health economic studies as a means of evaluating individual productivity; however, these statistics do not capture "presenteeism", when an individual is at work with a lowered productivity level, quantify the loss of non-paid working time, or capture externalities such as having an affected family member. Also, considering the variation in global wage rates or in societal values, statistics used may be contextually, geographically confined, and study results may not be internationally applicable.

Though studies have demonstrated mental health care to reduce overall health care costs, demonstrate efficacy, and reduce employee absenteeism while improving employee functioning, the availability of comprehensive mental health services is in decline. Petrasek and Rapin (2002) cite the three main reasons for this decline as (1) stigma and privacy concerns, (2) the difficulty of quantifying medical savings and (3) physician incentive to medicate without specialist referral. Evers et al. (2009) have suggested that improvements could be made by promoting more active dissemination of mental health economic analysis, building partnerships through policy-makers and researchers, and employing greater use of knowledge brokers.

# 3.6 Rethinking Marketing Strategies in the Indian Healthcare Sector

## 3.6.1Introduction

The Indian healthcare sector has emerged as one of the largest service sectors in India in terms of revenue and employment, and the sector is expanding rapidly. The sector has registered a growth of 9.3 percent between 2000-2009, comparable to the sectoral growth rate of other emerging economies such as China, Brazil and Mexico. At the current growth rate, the healthcare industry in India will touch US\$ 275 billion by 2020, according to a recent press release by the Confederation of Indian Industry (CII). The high growth of the industry is primarily driven because of domestic reasons and some of these are:-

• India's growing population and the increase in the number of affordable middle class people in the country.

- India is seeing a shift in disease pattern from communicable diseases to the high incidence of non-communicable and lifestyle-related diseases which has triggered a demand for specialized treatment.
- In-patient revenues of hospitals have increased since expenditure on lifestyle-related diseases has risen substantially.
- Rise in insured population and widening demand supply gap.
- A growing elderly population is also pushing for better facilities in the country. Others like wellness programmes, fitness programmes, health management, and preventive medicine-synonyms of healthcare are also growing more and more familiar.

# 3.6 .2 Marketing of healthcare services

Healthcare services have certain characteristics that differentiate them from products. Services are perishable, intangible and variable. According to Ashok Anantram, president, business development, Apollo Hospitals, Chennai, "Marketing as a concept is the same in product and service industry. There is a product or service - one section produces it and the other consumes it. Marketing is interplay between producers and consumers." However, the difference comes in marketing tangible and intangible products. While products that can be seen, felt, touched and tasted are tangible, the products that are based on post-sale experience are intangible. Consumers can come up with desirable parameters for a tangible product in terms of productivity, efficiency, etc. It is very difficult to rate an intangible product, he explains.

Marketing of healthcare services encompasses the analysis and management of four factors (also called the four P's) essential to the delivery of health care:-

- Product i.e. the type of health care service to be offered
- Place i.e. how the service will be delivered to the patient, location and mode of access.
- Price, often much bigger than the money price- which the patients pays in terms of pain, sufferings and rude treatment at the hands of hospital personnel and
- Promotion i.e. how and what the prospective patient learns about the organization and the services it offers.
- Some marketing experts however feel that a fifth P for successful marketing is public relations. Good public relations build up goodwill and an image to influence opinions, which ultimately lead consumers to choose the hospital and its services. According to Dr Saumitra Bharadwaj, marketing manager at Fortis hospital, NOIDA, "hospitals should create goodwill for themselves and should not completely rely on advertisements".

Until recently, marketing was considered by many as an unorthodox way of promoting healthcare. As a matter of fact, hospital being a service industry with a noble cause cannot utilize advertising techniques in the way other industries can. The new view of marketing is that it is the science and art of finding, retaining and growing profitable customers. Marketing strategies in the hospital industry would include the various aspects of retaining and growing profitable external direct customer clientele. The various factors that advocate the need for an in depth understanding of why marketing strategies are important in the hospital industry is broadly classified under the following heads:-

- customer based factors
- environment based factors

Today the customer is far more knowledgeable about the diseases and their choices of treatment, cost conscious, demanding more value addition and wants to reduce his/her risk by dealing with trustworthy companies, services and products. In the past customers would chiefly rate a hospital based upon the
quality of medical services provided. Studies have shown that consumers today have a host of factors based on which they rate the hospital. These include clean environment, availability of latest technology, hospital staff personnel mannerisms while providing service, time spent and methodology of imparting information, clarity and transparency of work and systematic nature of work, etc. There exists perhaps the need for greater transparency, honesty and better healthcare delivery with quality of service. Delighted customers are more likely to be loyal customers and loyal customers are more likely to give the company a larger share of their business. "As patients are the best ambassadors, it is important to take care of their needs and provide them with best possible care. Their apprehensions should be addressed so that they have the courage to come back to the same facility," agrees Ashok Anantram, president-business development, Apollo Hospitals, Chennai.

The competitive scenario has made it difficult for most hospitals and hence they need to continuously look out for new markets in order to generate a new clientele. The competition is not only rife but growing more intense every year. Many new hospitals are encroaching on the same market. It is becoming difficult for hospitals these days to depend on mere word of mouth promotion and advertisements to attract patients. We can no longer rely on word of mouth for getting patients. Hospitals, mainly the corporates ones, would definitely get more aggressive to survive the intense competition," avers Juhi Bhandari, marketing manager, Hinduja Hospital. Competition allows more alternatives to choose from and hence customers need not depend on a single service provider for meeting their needs. Hospitals must pay keen attention to their competitors. It has been very well said by Kotler that "poor firms ignore their competitors, average firms copy their competitors and winning firms lead their competitors". Successful companies design and operate systems for continuously gathering intelligence about their competitors. Since markets have become competitive, mere understanding of the customers is no longer enough. Hospital managements are putting extra effort in carving a brand image of the hospital and improving hospital's visibility. Hospitals also need to keep them abreast of the latest developments in the field, so that the distinction created by firm cannot be easily adopted by its competitor. It is very easy to replicate the medical services, technological advances and infrastructure in the hospital industry but a culture radiating positive influence on its customers is not always possible to replicate, as it requires a conscientious, systematic and planned approach by the organization.

#### 3.6 .3 Marketing strategies of hospitals

In the future more and more corporate healthcare institutions would approach the market aggressively to survive the intense competition. Even though some experts' feel that aggressive market is required to sustain today's competitive environment, others disagree saying that aggressive marketing is not necessary in healthcare sector as it would not fetch more patients. Patient's decision to choose a hospital is based on factors like facilities available in the hospital, expertise of doctors and the staff and vicinity. Hence all the professionally managed healthcare institutions should evolve a systematic approach for marketing with specific strategies and action plan. The up-gradation of standard service delivery, up-to-date infrastructure and facility development and research based innovative technique incorporated performance will equip the present institutions to withstand the tsunami of latest trends. In this multi crore business, the unforgettable mantra sustains: every satisfied consumer brings thousands of new consumers.

Tom Duncan and Sandra Moriarty presents a five-level 'customer bonding' framework that can be useful in conceptualizing a hospital's relationship with current and potential customers. These five levels are identified as:-

- Awareness: where the hospital's brand is included on the customer's menu of options.
- Identity:- where the customers identify with, and proudly display the brand.
- Connected: -where the customers communicate with the company between purchases.

- Community: where the customers recognize each other as a community of users, and communicate with each other
- Advocacy: where customers recommend the brand to others in order to include them in the community.

They underline the importance of developing a better understanding of the customer base through tracking data on transaction and communications interactions. In fact, it costs five times more to acquire a new customer than to retain an existing one. Some areas which need to be dealt seriously are the patient relationship management (PRM) and patient experience management (PEM). Another key recommendation they make is to periodically remind customers of the benefits that they are getting through the relationship. This will help in not only acquiring new customers but also in retaining the old ones. The hospital must incorporate the strategy of slowly and steadily trying to move the customers upward in the pyramid as shown in figure below. The shape of the pyramid indicates that fewer customers are at the highest level.



With the realisation of the importance of hospital marketing, many experts support the presence of a marketing department in the hospitals. Nowadays, we can find a functional marketing department in almost all private hospitals. The marketing department is said to be the voice of hospital where the brand is fashioned and communicated, internally as well as to the community at large. Liaison between in-house departments, organisational management, out-door agencies, medical management fraternity is the strength of the marketing department of a modern healthcare institution. The marketing department also helps in building liaisons with the medical officers of the foreign consulates to bring patients from abroad, opine Colonel B S Khimani, Director, and Administration of Jaslok Hospital. Some other strategies for hospital marketing that has evolved over the past few years are as follows: -

- Mergers and Acquisitions allows healthcare providers with immediate brand recognition and an aggressive scale up in new geographies. With M&A, new standards in healthcare services have been ushered in by large corporate hospitals. Merger of smaller hospitals and nursing homes with larger healthcare entities has led to better healthcare service delivery.
- International Accreditation: With the rising popularity of traveling to foreign countries for medical care, many in the US are raising concerns about the quality of healthcare that can be obtained abroad and how medical travelers can ensure the provider(s) they've chosen overseas are reputable. The largest and most widely recognized of the many accreditation providers in the US is the Joint Commission. The Joint Commission International (JCI) also offers accreditation to

medical providers internationally. It is one of the most stringent hospital accreditation processes where evaluation is done under 1033 measurable parameters. Hospitals can work towards obtaining the JCI seal which will help them garner international accreditation and thus get patients from abroad.

- **Full- fledged international patient services wing** in the hospitals will help boost medical tourism. Some facilities which can be made available are airport transfers, language translators, dedicated International patient rooms, cuisine choice subject to medical clearance and partnership with hospitality majors for recuperative holidays.
- Strategic alliances with global insurance majors' travel and charter operators, medical tourism organisations and corporates like International SOS, Blue Cross Blue Shield.
- **Organizing events,** both indoors and out-reach programmes, play a significant role in marketing of healthcare institutions. CME, awareness sessions for general public, free check-up camps, organizing events on health days, conducting interviews of specialists on visual media, printing and making readily available various emergency or appointment numbers are the commonest marketing tools.
- Traditional marketing, in or outside of the healthcare industry, must adapt for the new **eHealth era**. Hospitals should capitalize on the advent of the internet and develop new media forms to promote the services offered by them. E-detailing such as video- conferencing and the use of email and related technologies to promote two way communications are very useful. The hospital website too can serve as a source of information gathering and interaction for outstation patients.

It is very important that healthcare establishments adopt healthy practices to market themselves. Hospitals should work towards becoming the most trusted brands and this is achieved when they deliver services which give their customers the utmost satisfaction. The good news is that the Indian market for the hospital industry is yet to reach the saturation stage, and still has ample scope for development. International quality and accreditation standards will enhance the image of the Indian hospitals and put them on the world map. Service delivery, clinical expertise, and medical technology will also help the hospitals to create a good image about them. Soft skills to all, including the doctors are a pre-requisite for marketing/branding exercises. Besides, there should be consistency in the process of delivering healthcare in a hospital. Any negligent act of a doctor, a nurse or a technician or a wrong surgery can put the health, happiness, even the life of the patient in jeopardy. Hence, it is important that all healthcare institutions start identifying their quality needs and implement processes which create transparency in consumer experience.

# 3.7 Is Health Care Different?

Health care is different from other goods and services: the health care product is ill-defined, the outcome of care is uncertain, large segments of the industry are dominated by nonprofit providers, and payments are made by third parties such as the government and private insurers. Many of these factors are present in other industries as well, but in no other industry are they *all* present. It is the interaction of these factors that tends to make health care unique.

Even so, it is easy to make too much of the distinctiveness of the health care industry. Various players in the industry—consumers and providers, to name two—respond to incentives just as in other industries.

Federal and state governments are a major health care spender. Together they account for 46 percent of national health care expenditures; nearly three-quarters of this is attributable to Medicare and Medicaid. Private HEALTH INSURANCE pays for more than 35 percent of spending, and out-of-pocket consumer expenditures account for another 14 percent.

Traditional NATIONAL INCOME ACCOUNTS substantially understate the role of government spending in the health care sector. Most Americans under age sixty-five receive their health insurance through their employers. This form of employee compensation is not subject to income or payroll taxes, and as a result, the tax code subsidizes employer purchase of employee health insurance. The Joint Economic Committee of the U.S. Congress estimated that in 2002, the federal tax revenue forgone as a result of this tax "subsidy" equaled \$137 billion.

# 3.8 Risk and Insurance

Risk of illness and the attendant cost of care lead to the DEMAND for health insurance. Conventional economics argues that the probability of purchasing health insurance will be greater when the consumer is particularly risk averse, when the potential loss is large, when the probability of loss is neither too large nor too small, and when incomes are lower. The previously mentioned tax incentive for the purchase of health insurance increases the chances that health insurance will be purchased. Indeed, the presence of a progressive income tax system implies that higher income consumers will buy even more insurance.

The 2002 Current Population Survey reports that nearly 83 percent of the under-age-sixty-five POPULATION in the United States had health insurance. More than three-quarters of these people had coverage through an employer, fewer than 10 percent purchased coverage on their own, and the remainder had coverage through a government program. Virtually all of those aged sixty-five and older had coverage through Medicare. Nonetheless, approximately 43.3 million Americans did not have health insurance in 2002.

The key effect of health insurance is to lower the out-of-pocket price of health services. Consumers purchase goods and services up to the point where the marginal benefit of the item is just equal to the value of the resources given up. In the absence of insurance a consumer may pay sixty dollars for a physician visit. With insurance the consumer is responsible for paying only a small portion of the bill, perhaps only a ten-dollar copay. Thus, health insurance gives consumers an incentive to use health services that have only a very small benefit even if the full cost of the service (the sum of what the consumer and the insurer must pay) is much greater. This overuse of medical care in response to an artificially low price is an example of "moral hazard".

Strong evidence of the moral hazard from health insurance comes from the RAND Health Insurance Experiment, which randomly assigned families to health insurance plans with various coinsurance and deductible amounts. Over the course of the study, those required to pay none of the bill used 37 percent more physician services than those who paid 25 percent of the bill. Those with "free care" used 67 percent more than those who paid virtually all of the bill. Prescription drugs were about as price sensitive as physician services. Hospital services were less price sensitive, but ambulatory mental health services were substantially more responsive to lower prices than were physician visits.

## 3.9 Is the Spending Worth It?

National health care spending in 2002 was \$1.55 trillion, 14.9 percent of GDP. By comparison, the manufacturing sector constituted only 12.9 percent of GDP. Adjusted for INFLATION, health care spending in the United States increased by nearly 102 percent over the 1993-2002 period. Hospital services reflect 31 percent of spending; professional services, 22 percent; and drugs, medical supplies, and equipment reflect nearly 14 percent.

David Cutler and Mark McClellan note that between 1950 and 1990 the PRESENT VALUE of per person medical spending in the United States increased by \$35,000 and life expectancy increased by seven years. An additional year of life is conventionally valued at \$100,000, and so, using a 3 percent real interest rate, the present value of the extra years is \$135,000. Thus the extra spending on medical care is worth the cost if medical spending accounts for more than one-quarter (\$35,000/\$130,000) of the increase in longevity. Researchers have found that the substantial improvements in the treatment of heart attacks and low-birthweight births over this period account, just by themselves, for one-quarter of the overall mortality reduction. Thus, the increased health spending seems to have been worth the cost. This does not mean that there is no moral hazard. Much spending is on things that have no effect on mortality and little effect on quality of life, and these are encouraged when the patient pays only a fraction of the bill.

## 3.10 Taxes and Employer-Sponsored Health Insurance

There are three reasons why most people under age sixtyfive get their health insurance through an employer. First, employed people, on average, are healthier than those who are unemployed; therefore, they have fewer insurance claims. Second, the sales and administrative costs of group policies are lower. Third, health insurance premiums paid by an employer are not taxed. Thus, employers and their employees have a strong incentive to substitute broader and deeper health insurance coverage for money wages. Someone in the 27 percent federal income tax bracket, paying 5 percent state income tax and 7.65 percent in SOCIAL SECURITY and Medicare taxes, would find that an extra dollar of employer-sponsored health insurance effectively costs him less than sixty-one cents.

Workers, not employers, ultimately pay for the net-of-taxes cost of employer-sponsored health insurance. Employees are essentially paid the value of what they produce. Compensation can take many forms: money wages, vacation days, PENSIONS, and health insurance coverage. If health insurance is added to the compensation bundle or if the health insurance becomes more expensive, something else must be removed from the bundle. Perhaps the pension plan is reduced; perhaps a wage increase is smaller than it otherwise would have been.

A recent study demonstrates the effects of rising insurance premiums on wages and other benefits in a large firm. This firm provided employees with wages and "benefits credits" that they could spend on health insurance, pensions, vacation days, and so on. Workers could trade wages for additional benefits credits, and vice versa. Health insurance premiums on all plans increased each year. When all health insurance premiums increased, the workers switched to relatively less expensive health plans, took fewer other benefits, and reduced their take-home pay. A 10 percent increase in health insurance premiums led to increased insurance expenditures of only 5.2 percent because many workers shifted to relatively cheaper health plans offered by the employer. The bulk of these higher expenditures (71 percent) was paid for with lower take-home pay; 29 percent by giving up some other benefits. Thus, if insurance premiums increased, on average, by \$200, the typical worker spent \$104 more on coverage and paid for this by reducing take-home pay by \$74 and giving up \$30 in other benefits.

These so-called compensating wage differentials, reductions in wages due to higher nonwage benefits, have important policy implications. They imply, for example, that a governmental requirement that all employers provide health insurance will result in lower wages for the affected workers.

## 3.11 Growth and Effects of Managed Care

The health care industry has undergone fundamental changes since 1990 as a result, in large part, of the growth of managed care. As recently as 1993, 49 percent of insured workers had coverage through a conventional insurance plan; in 2002 only 5 percent did so. The rest were in health maintenance

organizations (HMOs), preferred provider organizations (PPOs), or other forms of managed care. Unlike conventional insurance plans, managed care plans provide coverage only for care received from a selected set of providers in a community. The basic idea with managed care is to limit the moral hazard that comes from overuse of health care, thus keeping insurance premiums lower than otherwise and potentially making the insured person, his employer, and the insurance company better off. An HMO typically provides coverage only if the care is delivered by a member of its hospital, physician, or pharmacy panel. PPOs allow subscribers to use nonpanel providers, but only if the subscriber pays a higher out-of-pocket price. Conventional plans allow subscribers to use any licensed provider in the community, usually for the same out-of-pocket price.

Managed care changed the nature of COMPETITION among providers. Prior to the growth of managed care, hospitals competed for patients (and their physicians) by providing higher-quality care, more amenities, and more services. This so-called medical arms race resulted in the unusual economic circumstance that more hospitals in a market resulted in higher, not lower, prices. Conventional insurers (as well as government programs) essentially paid providers on a cost basis. The more that was spent, the more that was received. So providers rationally competed along dimensions that mattered. Managed care changed this by the use of "selective contracting." Not every provider in the community got a contract from the managed care plan. Contracts were awarded based on quality, amenities, services, and *price*. Research has demonstrated that in the presence of selective contracting, the usual laws of economics apply: the presence of more providers in a market results in lower prices, more idle capacity results in lower prices, and a larger market share on the part of an insurer results in lower prices paid to providers. As a consequence, health care costs increased less rapidly than they otherwise would have and health care markets have become much more competitive.

Managed care SAVINGs have been called illusionary. The plans have been accused of enrolling healthier individuals and providing less intense care. It is true that managed care plans disproportionately attract healthier subscribers. If this was all there was to managed care, the differences in costs between managed care and conventional coverage *would* be illusionary. However, a 2001 study demonstrates that the INNOVATION offered by managed care is its ability to negotiate lower prices. The authors examined the mix of enrollees, the service intensity, and the prices paid for care among Massachusetts public employees in conventional and HMO plans. The focus was on enrollees with one of eight medical conditions. Across these eight conditions, the HMOs had per capita plan costs that were \$107 lower, on average. Fifty-one percent of the difference was attributable to the younger, healthier individuals the HMOs enrolled; 5 percent was attributable to less-intense treatments; and 45 percent of the difference was attributable to lower negotiated prices. The conventional plan paid more than \$72,600, on average, for coronary artery bypass graft surgery while the HMO plans in the study, on average, paid less than \$52,000.8

Selective contracting arguably led to the slower rate of increase in health insurance premiums through the mid-1990s. Since that time insurance premiums have increased more rapidly. Health economists believe that this change is a result of consumers' unwillingness to accept the limited provider choice that comes with selective contracting, as well as from the reduction in competition that has resulted from consolidation in the health care industry.

## 3.12 Government-Provided Health Insurance

Medicare is a federal tax-subsidy program that provides health insurance for some forty million persons aged sixtyfive and older in the United States. Medicare Part A, which provides hospital and limited nursing home care, is funded by payroll taxes imposed on both employees and employers. Part B covers physician services. Beneficiaries pay 25 percent of these costs through a monthly premium; the other 75

percent of Part B costs is paid from general tax revenues. Part C, now called "Medicare-Advantage," allows beneficiaries to join Medicare-managed care plans. These plans are paid from Part A and Part B revenues. Part D is the new Medicare prescription drug program enacted in 2003 but not fully implemented until 2006.

In 1983 Medicare began paying hospitals on a diagnosis-related group (DRG) basis; that is, payments were made for more than five hundred specific inpatient diagnoses. Prior to DRGs, hospitals were paid on an allowable cost basis. The DRG system changed the economic incentives facing hospitals, reduced the average length of stay, and reduced Medicare expenditures relative to the old system. In 1999 Medicare began paying physicians based on a fee schedule derived from a resource-based relative value scale (RBRVS) that ranks procedures based on their complexity, effort, and practice costs. As such, the RBRVS harkens back to the discredited labor theory of value. Medicare payments, therefore, do not necessarily reflect market prices and are likely to over- or underpay providers relative to a market or competitive bidding approach. Thus, it is not surprising that physicians have argued that the system pays less than costs and some have begun to refuse to accept new Medicare patients. Moreover, the Medicare program effectively prohibits physicians from accepting payments higher than the fee schedule from Medicare beneficiaries. The result is a system of PRICE CONTROLS that will result in shortages whenever the fee schedule is below the market-clearing price.

Medicaid, a federal-state health care program for the poor, covers more than forty million people. The federal government pays 50-85 percent of the cost of the program depending on the relative per capita income of the state. States have considerable flexibility in determining eligibility and the extent of coverage within broad federal guidelines. Medicaid is essentially three distinct programs—one for low-income pregnant women and children, one for the disabled, and one for nursing home care for the elderly. Approximately 47 percent of recipients are children, but the aged and disabled receive more than 70 percent of the payments. Much of this is due to nursing home expenditures; Medicaid provides approximately 40 percent of nursing home revenue.

State governments have gamed the system to obtain federal matching Medicaid funds. The state would tax a hospital or nursing home based on Medicaid days of care or the number of licensed beds. It would then match the taxes with federal matching dollars at a ratio of two to one or three to one, and essentially return the taxed dollars to the provider. When the federal government said this was not permissible, the states dropped the taxes and asked for "provider contributions" from the hospitals, nursing homes, and so on. Most states used the new federal money for health care services. Others simply reduced general fund expenditures by the amount of the new federal dollars—essentially using federal Medicaid dollars to fund road construction and other state functions. Neither "taxes" nor "contributions" may now be used. The states do, however, funnel state mental health and other state health program dollars through Medicaid to take advantage of the matching grants.

The expansion of the Medicaid program, particularly for children, also has had the effect of crowding out private coverage. One estimate suggests that for each two new Medicaid children enrolled, one child lost private coverage.

#### 3.13 Regulation and the Health Care Market

The health care industry is one of the most heavily regulated industries in the United States. These REGULATIONS stem from efforts to ensure quality, to facilitate the government's role as purchaser of care, and to respond to provider efforts to increase the demand for their services. Hospitals and nursing homes are licensed by the state and must comply with quality and staffing requirements to maintain eligibility for participation in federal programs. Physicians and other health professionals are licensed by the states.

Prescription drugs and medical devices are regulated by the Food and Drug Administration. Some state governments require government permission before allowing a hospital or nursing home to be built or extensively changed. All of the above regulations restrict SUPPLY and raise the price of health care; interestingly, those who lobby for such regulations are medical providers, not consumers, presumably because they want to limit competition.

Some state governments limit the extent to which managed care plans may selectively contract with providers. All state governments have imposed laws governing the content of insurance packages and the factors that may be used to determine insurance rates. While these may enhance quality, they do impose costs that raise the price of health insurance and increase the number of uninsured. In testimony before the Joint Economic Committee of the Congress, one analyst reported the annual net cost of regulation in the health care industry to be \$128 billion.

## **3.14 Industry Structure**

In 2002, there were 4,949 nonfederal short-term hospitals in the United States. Over the last decade the hospital sector has been consolidating: the number of hospitals declined by 6.4 percent and hospital beds per capita declined by more than 18 percent. In addition, the sector has been reorganizing itself into systems of hospitals that are commonly owned or managed. Nearly 46 percent of hospitals were part of a system in 2002, up from only 32 percent in 1994. The hospital sector has long been dominated by not-for-profit organizations. Only 14.4 percent of the industry is legally for-profit; this ratio has been constant for the last decade. There is some evidence that the consolidation and reorganization have been a reaction to the competition generated by the selective contracting actions of managed care. In 2001, the average cost of a stay at a government hospital was \$7,400—24 percent more than at a private for-profit hospital. A study released in 2000 found that for-profit hospitals offer better-quality care.

There were 272 private sector physicians per 100,000 population in the United States in 2002, an 8 percent increase since 1993, but a decline since 2000. There has been a steady decline in the proportion of physicians in solo practice; by 2001 more than three-quarters of physicians were in group practice or were employees. Physicians have been accused of inducing demand for their services because of the INFORMATION asymmetry they hold relative to their patients. However, this argument has lost much of its impact in the last decade. Physicians' inflation-adjusted average income has declined. Primary care physician incomes declined by 6.4 percent between 1995 and 1999, and specialist income declined by 4 percent.

## **3.15 Industry Outlook**

The industry is faced with rising health care costs and an increasing number of uninsured. In the private sector the cost increases have led to an interest in consumer-directed health care. The idea is to provide health insurance payments only for expenditures in excess of a high deductible. The expectation is that consumers who must pay the full price for most health services will buy such services only when the expected benefits are at least equal to the full costs. Others see the reemergence of more aggressive selective contracting by managed care firms as a way to keep costs under control. The government is expected to be more aggressive in promoting competition among providers as well.

The retirement of the baby boom generation will put more pressure on Medicare. Indeed, the Medicare trustees reported in 2004 that the costs of the Medicare program will exceed those of Social Security by 2024. Medicare Part A—hospital coverage—is estimated to be unable to cover its expenses starting in 2019. Interestingly, the 5 percent of Medicare fee-for-service beneficiaries who die each year account for one-fourth of all Medicare inpatient expenditures. Tax increases, benefit reductions, and/or wholesale

reform of the program will have to occur. The number of uninsured will increase if health insurance continues to be more expensive. Some have proposed expansions of existing public programs; others have proposed "refundable" tax credits as a means of subsidizing targeted groups. Still others argue for reductions in regulations and a greater reliance on consumer-directed health plans as a means of lowering costs and expanding insurance coverage.

**Review Questions** 

- 1. Define the Health economics?
- 2. Explain the Health care demand?
- 3. Explain the Risk and Insurance in Healthcare Sector?
- 4. Explain the Mental Health Economics?

#### **Discussion Questions**

Discuss the Indian Healthcare Sector in details?

## Lesson 4 – Demand for and supply for health care services

Learning Objectives

- To define the Demand in health care services.
- To explain the Supply in health care services.
- To discuss the ways of building Demand in Health Services.
- To describe the People-Centred Care.

#### 3.1 Demand and supply for health care services

Economic equilibrium occurs in most industries when supply equals demand. Everyone is satisfied. However, in health care, equilibrium cannot occur. Demand in health care can never be satisfied. No country--none--can ever meet its population's need for medical services. Another person will always need treatment, after supply of goods and services is exhausted.

## 3.1.1Supply

Delivery of medical care services requires both organic and inorganic resources. Inorganic resources include beds, buildings, professionals' time, disposable syringes, catheters, scalpels, money and bandages. Organic resources include body parts, blood, skin tissue, organic compounds, and organs for transplant. In order to treat one patient's disease, all necessary inputs--organic and inorganic resources--must be available all at the same time and in the same place.

#### 3.1.2 Demand

Each patient's disease and treatment needs both organic and inorganic resources from the supply pool. As long as all the necessary inputs are timely available, each patient gets treated. If one indispensable supply item is missing, then a patient's medical need cannot be met.

#### 3.1.3 Equilibrium

Because unlimited demand will always exceed limited supply, resources needed to treat some patients will be exhausted too quickly, leaving some patients without treatment. Nations must choose which resources to make available and how those will be utilized. Nations must also choose which patients will be treated, and who must be denied medical care.

## 3.1.4 Roles

In a free-market system like the United States, the allocation of goods and services to patients is controlled by law, market competition, insurance contracts, provider organizations, pharmaceutical firms, geography, population demographics, and for-profit versus not-for-profit businesses. Government is the legislator and regulator. Providers decide whom they will treat, when, and on what terms.

In the United States, providers (for example, cosmetic or eye surgeons) and manufacturers, like pharmaceutical firms, can artificially alter the population's demand for goods and services and cause reallocation and diversion of supply, that is, the pool of resources. Some patients' desire for non-necessary medical care will be satisfied at the expense of other patients' untreated disease. That imbalance of power within the health care delivery system can result in unduly premature deaths. Some countries restrict profit-driven manipulation of their medical care delivery systems.

## 3.1.5 Patients

Patients' demands for care cause supply to be utilized. Two patients cannot use the identical resource. One patient's choices affect the remaining supply for other patients' needs. Patients must judiciously balance their choice to receive care and utilization of resources with the resulting unmet, medical needs of their neighbors.

To ensure fair and sufficient allocation of each nation's limited resources, patients must consider their neighbors' needs, when choosing and refusing treatment for themselves.

## **3.2 Building Demand for Health Services**

Increasingly, public health, including reproductive health care provision, is being seen as a system — a changing dynamic of entitlement and obligations between people, communities, providers and governments. Within this new lens, community participation, health promotion, social support and empowerment of individuals (especially of women) are seen as critical to achieving sustainable improvements in reproductive health care.

In other words, good reproductive health requires partnership. While governments are obliged to make quality reproductive services and information widely accessible, users should be encouraged to articulate what they need and expect in terms of services. Users can also provide valuable input into monitoring and evaluation efforts that can improve quality of care. In this way, users can provide a feedback mechanism to support services appropriate to their needs.

The health care system can be seen as an interaction between supply (trained personnel, equipment and services) and demand (active participation from individuals, groups and communities for quality services). Interaction between these two parts of the system can improve the reproductive health needs of users.

#### 3.3 Empowering individuals and mobilizing communities

The idea of human rights underpins this whole model. The rights of individuals to exert control over their own lives and their reproductive and sexual health needs have been acknowledged by the international community. But people need information, as well as affirmation and support, in articulating and exercising their rights and in creating demand for the services they need.

That's why UNFPA works on many levels. In addition to supporting reproductive health services, the Fund also promotes behaviour change communications, advocacy, education and empowerment of women. These kinds of interventions can encourage individuals and communities to increase demand and support for quality reproductive health services.

A UNFPA-supported programme, Stronger Voices for Reproductive Health exemplifies how programming can strengthen reproductive health services through a focus on the interaction between supply and demand.

## 3.4 Making childbirth safer: an example

As an example of how this systematic approach can work, consider the goal of reducing maternal mortality, one of the priorities selected by the international community for inclusion in the Millennium Development Goals. Reducing maternal mortality will require specific inputs, such as the availability of skilled birth attendants and access to emergency obstetric care. But progress can be accelerated if pregnant women are empowered to make informed decisions about childbirth. In many parts of the world, male relatives or in-laws decide where a woman will give birth, or when she should get emergency care.

Educating women, and giving them more opportunities, can help change this power balance. Communities that are fully informed about the needs and vulnerabilities of pregnant women can be a part of this as well. For example, they can work to build awareness of the danger signs of pregnancy, pool resources to help out in an emergency, or find ways to safely transport women in labour to an appropriate facility if complications develop.

## 3.5 Process Improvement and Supply and Demand: The Elements That Underlie Integration

Integration relies on a series of key change strategies connected by a fundamental dynamic: system capacity has to match demand or it will ultimately result in expanding delay and system failure. A balance of supply and demand is necessary for successful system performance. If demand and capacity are balanced, then delays are not required.

#### 3.5.1 Integration

Integration as a system strategy has been evolving within health systems across Canada. In Alberta, it was first a way of bringing together services within and between the former system of regional health entities, and now within the province-wide Alberta Health Services amalgamation of the former health regions, the Alberta Mental Health Board and the Alberta Cancer Board. The intent of these integration efforts was described in the former Capital Health region as a focus on "building stronger connections between health services, people and providers to better support people in their care journey and realize the benefits of a regional health system" (Abbott 1999: 13).

These integration efforts identified four "key change strategies" as central to the process of better integrating services and achieving best practice:

- 1. Providing people-centred care
- 2. Reducing clinical variance
- 3. Organizing the care continuum
- 4. Process improvement

While these four key strategies seem to act as independent perspectives on integration, they are, however, implicitly connected. In order to realize the full potential of integration, it is critical to convert the implicit connection to an explicit one. The fundamental underlying dynamic in healthcare is relatively simple: every day, all day long, and one person or service at a time, we use our system capacity to meet customer

demand. We either perform this function well or poorly. While system performance is a choice, matching capacity to demand is not.

Operationally, healthcare is no different than any other flow system where customer demand flows through a series of interrelated, interconnected people or process steps as that demand traverses the system. Each step has a demand, a supply/capacity, an activity and a delay. System performance is assessed or gauged by measuring the delay, either at each step or for the series of interconnected steps. The measure of delay demonstrates how well our systems function in matching demand to capacity. Permanent mismatch of demand to supply will result in expanding delay and system failure. A balance of demand and supply is therefore required for successful system performance. If demand and capacity are balanced, then we simply do not need a delay. The four key strategies are merely external manifestations of this basic underlying dynamic.

## 3.5.2 Providing People-Centred Care

While this strategy focuses on efforts to optimize patient understanding of and participation in the care journey, a key component of people-centred care must focus on meeting customer demand without delay. All efforts to foster people-centred care are meaningless and unachievable if a demand/supply mismatch exists. There are two critical issues here: First, can the organization actually deliver on the promises to deliver care? Is there enough capacity to accomplish this? And second, if there is enough measurable capacity, can the organization accomplish these tasks without a delay? If measured demand can be balanced and met by a corresponding measured supply, then there is no need for delay. If demand exceeds capacity, there is no solution. Attempts at triage, priority or sorting are misguided efforts to deal with either a real or perceived mismatch, and serve only to degrade system performance. Arbitrary delays just increase cost, increase the risk of "no-show" for the requested service and use up precious supply resources simply to sort the work. Either demand is balanced by supply, or it is not.

At the same time, people-centered care does not mean that the individual customer is always right or that every customer always gets what he or she wants. There are measurable capacity limits for both individual and practice. If those practice or individual limits are exceeded – that is, if the measured demand exceeds the capacity – then the individual or practice simply cannot perform the expected work tasks. Intentionally delaying the work through priority mechanisms does not change this dynamic. "People-centered" means that organizations need to measure and understand those limits and work to improve capacity and capability but, most importantly, make those limits clear and explicit.

People do not want to be presented with false dilemmas such as "you can have quality but you have to wait," or "you can have choice but you have to wait." Organizations will often pose the false choice of choosing your own provider versus a delay. Providers of care, departments or services all have measurable capacity limits, and if the capacity can meet the demand then there is no need, with the exception of predictable supply absence, to tolerate a delay. Promising service to a patient when demand exceeds supply, and using a delay to accomplish this, makes no sense. If demand exceeds supply and promises are made to patients to meet the demand, these are false promises, as some unknown random demand will be neglected. It is not patient-centered to offer a service that exceeds provider, enterprise or system capacity limit. Systems need to solve problems for the many, sometimes at the expense of individual preference.

Example: We worked with a primary care practice in the Southern United States. One of the physicians is a woman who was quite "popular." New patients were accepted into the practice based on "choice" and popularity. There was no measurement of physician capacity limit. The refrain from the practice was that this physician was "busy" and "was popular with all of women patients and we are all about being patient-

centred." There were no measurements of system performance. Delays were reported as "a long time" and "not very long." There was no formal concept of a panel but, instead, there was a loose and ambiguous "promise" of a relationship. When we finally measured system performance, we found that the physician had a panel size that far exceeded her capacity to complete the work, that delays for her were extended (anywhere from 30 to 360 days), that the practice had initiated an elaborate priority system that they used to bargain with patients and that close to 25% of this physician's patients cut the queue and saw her colleagues. As a consequence, the lowest priority was for women with prevention and surveillance needs. These women were pushed, by priority and false "choice," beyond the recommended threshold for these preventive services. Within this cohort of patients with delayed care, we "discovered" five patients with breast cancer and two with cervical cancer. The physician, of course, stated that "this is not my fault," and "these patients choose to wait." Systems with an inherent mismatch of demand to supply will always fail.

Too often, *patient-centered* is a vague and loose term that describes what the supply or system determines patient needs to be. Supply dictates to demand. This is quite simple: Investigations, surveys and studies all reveal the same concerns. Patients want the opportunity to choose their provider or venue of care; they want to have access to that provider or venue when they choose, not when the system says it is "possible"; and they want a quality healthcare experience. In common colloquium: "let me choose, don't make me wait to enter the system at any point, and don't make me wait at the point of care" (Murray and Berwick 2003; Murray et al. 2003). There are, of course, other considerations in any discussion of people-centred care: the quality of the care itself, participation opportunities, promises and reliable systems, information and support. But these considerations are not possible without the fundamental underlying balance of patient demand and system capacity.

## 3.5.3 Reducing Clinical Variance

Variation is a problem in all flow systems. Variation arises from the demand or supply side, whether operational or clinical, and creates flow turbulence. Variation can represent a temporary mismatch of demand and supply, resulting in either unused capacity when supply exceeds demand or a delay when demand exceeds supply. Multiple non-standardized processes are a manifestation of variation. Variation results in multiple smaller channels of work, which in turn increase the risk of mismatch with the consequent unused capacity or delay, and increase the risk of error and the need to repeat demand.

Variation in clinical care functions in a similar manner. Clinical care variation, manifested by multiple care processes, leads to errors that in and of themselves can be harmful, but from a flow perspective an error represents a demand that has to be repeated.

The antidote then is clear: reduce the variation. Standardized, non-variable clinical care is characterized by a series of interrelated steps or interventions – tests, procedures or treatments – organized in a prescribed sequence in order to achieve an aim of measurable optimized outcome. Both the process as a set of sequential steps, and each individual step itself, require harmonic convergence of a number of critical supply components. The ultimate governor of flow is the patient's physiology. The work cannot move any faster than that physiology. At the same time, the process and the steps can only proceed as fast as the slowest, most delayed of those components. Clinical interventions are all crafted to accelerate, supplement or support the patient's physiology. Hence, underneath the interventions, decisions and treatments, clinical care is subject to the same operational dynamic of demand and supply matching. Clinical care can never be fully optimized unless the demand can be moved to the right supply, right on time. Once the flow dynamic, the matching of the supply and demand, is accomplished, in order to begin to improve clinical care processes, process variation must also be eliminated.

Example: We worked with a specialty care practice in which demand entered the practice as referrals primarily from primary care. While the referral demand exhibited some variation in the volume range of referrals, this variation was analyzed and found through statistical process control methods to be "natural variation" – a variation that is inherent to the system. The only way to deal with natural variation is to flex capacity to meet up- or downswings of demand. On the other hand, an analysis of the office supply demonstrated a wide range of office appointment availability. This variation was found to be artificial, that is, created by intentional actions within the system. The best method to deal with this is to plan. These findings surprised the practice since they thought that the sole source of variation and the cause of the oscillating delays was the variation in demand. Reducing the artificial variation caused by the supply helped the practice keep up with the demand and work with a minimal wait. In this practice, variation in flow created variation in clinical care process. Once the flow variations were eliminated, the practice developed service agreements, which minimized the clinical care process variation and allowed for improvement.

## 3.5.4 Organizing the Care Continuum

The flow dynamic discussed extensively above clearly applies to the key strategy of organizing the care continuum. The explosion of healthcare knowledge and customer expectation has made it impossible for the current cadre of clinicians to keep up with workload demands. This mismatch is particularly acute in the primary care setting. Standardization of process, the development of techniques and technologies to share information, and the introduction of multi-disciplinary team approaches to care will be essential to meet these needs. These enhancements to care delivery will not be successful unless optimal system performance is guaranteed by a demand/supply balance. With more potential hand-offs, there is an increased risk of error and delay. People view system performance as a sum of the waits. With increased numbers of clinicians and processes involved in the care continuum, paying attention and measuring system performance at every step is critical. Successful care can only proceed at the rate of the slowest step.

The same conditions exist in the acute care hospital setting. Here, however, there are far more hand-offs, far more customized journeys. Much of this work can be standardized and "leveraged" through a multidisciplinary focus, and all of it can be measured. People moving through these complex systems need to be guided by predetermined "trip plans" that outline the journey, the expectations and the prescribed sequence of events. Measurement in these complex venues is just too great for the isolated human brain and requires more sophisticated tools to gauge, assess, measure and monitor basic system performance. These tools need to measure and display flow of work in real time, as well as using past behaviours and actions to model and predict future events. The entire continuum needs to be investigated. Individual, isolated solutions will often just move the delay to the next silo or next step and not solve the flow for the customer. For "continuum" improvement, all steps need to work together, which requires a common measurement system: was the customer demand met by system capacity at each step and at the sum of all steps?

Example: Many acute care improvement efforts focus on "fixing" a single isolated part of a flow system. Poor acute care system flow is commonly manifested at the first step – the emergency department (ED). Constraints deeper within the system create a bottleneck, and the work backs up into the ED. One common strategy for reducing the impaction and crowding in the ED is to implement an "express admission unit" (EAU). This is a physical place where patients who have completed their ED evaluation and need to be admitted are sent. EAUs are commonly staffed with personnel from the bed units, and patients are held there until a bed opens. This all sounds fine. The work is moved out of the ED, and the overcrowding in that venue is relieved. But what is the system effect? The EAU acts as a holding tank, drawing resources away from patient care in the next step – the bed and floor. There is another risky

hand-off from the EAU to the floor, and the patient's total length of stay (LOS) actually increases. The extension of LOS fills more beds for more days, resulting in an even higher likelihood of more bed constraint.

## 3.5.5 Improving Process Management

Healthcare has struggled for years with improvement. In the past, most improvement efforts were based on anecdote, opinion and "feelings." There was no common unifying philosophy or any consistent method to determine whether the changes proposed or implemented actually resulted in improvement. "Improvement" meant change, but that change was most often an isolated event unconnected to any previous event. The aim or goal was commonly vague and nebulous, and there was only infrequent measurement to assure that the change actually resulted in improvement toward a clear, quantifiable aim.

In the past two decades, a number of improvement strategies that have evolved outside healthcare (primarily in "Industry") have been applied in healthcare settings. These improvement strategies have had the advantage of internal consistency and for the most part have a structure that links aim to change and to measure. These methodologies have been used to address multiple operational processes, including centralization of services such as "central booking"; development of standard processes for admissions, transfers, referrals and discharges; and bed and length-of-stay management, case management and discharge coordination (Nolan et al. 1996).

These improvement methodologies have included:

- **Total Quality Management:** In simple terms, TQM refers to "getting products and services right the first time, rather than waiting for them to be finished before checking for errors."
- **Re-engineering:** Re-engineering is an attempt to break an organization down into component parts and then put it back together in a new and more "efficient" way. All processes are flow-mapped, redundancies are identified and removed, and disparate silo processes are identified and combined. Processes are more important than product: indeed, good products and outcomes should naturally follow good processes.
- **Queuing Methods:** Queuing looks at lines: how demand meets supply. Queuing focuses primarily on static systems where supply is fixed and demand varies, and offers insight on the trade-off between demand and/or supply variation and service levels (delays). While queuing methods tend to focus on retrospective events, more sophisticated queuing methods offer views of how current systems function and offer analysis that can be applied to strategies for improvement.
- **Theory of Constraints:** TOC, using the premise that a system can flow only as fast as the slowest component, offers insights into flow both across systems and through smaller processes within a system.
- **Model for Improvement:** This model, used extensively by the Institute for Healthcare Improvement, is characterized by "Plan, Do, Study, Act" (PDSA) cycles. The model focuses on the connections between aim, change and measure.
- **System of Profound Knowledge:** SoPK, originated by Deming in the 1980s, contends that "quality" equals value for all stakeholders, including society, and that value is defined by these stakeholders. SoPK has four interlocking components: understanding or appreciation of the system (how the parts fit together), understanding of variation (ability to distinguish common from special-cause variation and to act accordingly), theory of knowledge (understanding that knowledge is built on theory and predictions; information is not knowledge) and psychology (understanding of people, interactions between people and circumstances).
- Six Sigma: Popularized by Motorola, Six Sigma looks at process, "system" or event; the mean performance of that process, system or event; and the variance in performance and then identifies

the standard deviation from the mean, and whether that process is in control and exhibits natural, common-cause variation, or is out of control, exhibiting unnatural, artificial variance.

- Lean Thinking: The Lean method identifies the "value stream" from the customer perspective and seeks to eliminate all waste from the system. "Waste" includes waste of time, caused by demand/supply mismatch. Lean has a clear focus on value and on "pull" systems, wherein work is pulled from Step 1 by Step 2 rather than pushed forward from Step 1 into Step 2. Lean seeks perfection in flow across the value stream.
- Lean/Six Sigma: Combining the Lean-equals-zero-waste approach and the Six Sigma-equalszero-variation approach, Lean/Six Sigma creates synergies and a more robust set of change strategies.

At their core, all these improvement strategies indirectly address the same operational reality: how does a system, an organization or a business enterprise successfully match customer demand to system capacity, and, secondly, how is that accomplished with minimal delay? While matching demand to supply is universally implied in all of these strategies, it is not made explicit. This is due to an instinctual knowledge of how things work. Matching customer demand to system capacity and doing so without a delay is considered obvious, and that knowledge is assumed.

**Total Quality Management** looks at "getting the product right, the first time," which is essentially a demand reduction strategy. The process flow-map component of **Re-engineering** seeks to reduce redundancy and to standardize for reliability. Both these strategies serve to reduce demand and result in improved demand-to-supply match. Queuing methods clearly address matching issues and focus primarily on "service level": how service levels deteriorate or delays accumulate due to poor matching. These methods, in addition, explore multiple levels and types of variation – in volume of demand or supply, in arrival rates and in server time – and illustrate the consequences of that variation. Theory of **Constraints** investigates how demand meets supply, either as a series of interrelated steps or at a single point where more than one supply component is needed to successfully complete the process step. TOC addresses customer delays as a result of either a single process delay in a chain of multiple processes, or a supply component delay at a single step. The Model for Improvement only obliquely addresses demand and supply, but does utilize many of the other methods with the change and measure components. The System of Profound Knowledge not only addresses variation but emphasizes worker knowledge of the process and context. This knowledge starts to make matching demand and supply much more explicit. Six Sigma focuses on variation. Variation is a temporary mismatch of demand and supply. A reduction in variation results in a better match and smoother flow. Lean Thinking actually maps the flow of demand as that demand moves through supply gates and seeks explicitly to eliminate waste, including the waste of time. Lean emphasizes continuous flow through demand/supply matches at each step, identification of constraint to that flow, error-proofing to reduce demand, and layout optimization and planning. Lean/Six Sigma combines these last two methodologies for a more focused view of variation at each step in the "value stream."

While the work in healthcare shares the same basic fundamental dynamic as many other businesses and industries, there is a common misconception that "we are different." This false belief allows healthcare demand/supply matching to escape scrutiny. These improvement methodologies are often applied in healthcare but not at full potential value. The fact that these methods are clearly crafted to investigate efficiencies in matching demand to supply is lost.

The methods are only tools – lenses through which to see how systems perform. The greatest value for these tools comes when the tools are applied in an integrated combination and not in isolation in order to explicitly view demand and supply dynamics.

Healthcare system performance is often measured by revenue, cost, satisfaction or clinical outcome. These are superficial indirect measures of performance. None of these measures can be optimized unless the fundamental issue was met: did the system successfully match customer demand to customer supply? Successful performance in that arena sets the stage for optimization in all the other areas. An organization may perform well in a single isolated area, such as patient satisfaction or revenue generation, but in so doing may sub-optimize overall system performance. One area is "elevated" to the detriment of all other areas. Successful demand/supply balance is the glue that holds all system performance together, and balance is foundational.

The most successful system performance improvements will be achieved when an organization can integrate components of all these improvement methods. But to accomplish this integration, all these approaches need to be combined into a unified whole, where matching demand to supply is explicit rather than implicit.

If demand into any system exceeds the capacity of that system, the system will fail. That mismatch will inevitably lead to expanding delays and ineffective and short-sighted attempts, like priority and triage, to solve the mismatch. Failure to understand this basic dynamic, a focus on change without a context, coupled with efforts to improve isolated components of a larger system, leads to sub-optimization. Some examples:

- Emergency room: The ER is the first demand/supply step into a much larger interconnected system. Mismatch of excessive demand compared to supply deeper in the system can result in gridlock in the ER. Emergency room improvement efforts, utilizing many of the improvement methods discussed above, often focus on making changes in the ER alone: the initiation of bedside registration to reduce steps, the development of "fast track" for the not-so-sick, and the implementation of an express admission unit a place to park patients who have completed the ER journey but have no bed. While these changes improve the flow and efficiencies of the ER, the demand and the delay are just sent further downstream. Bedside registration reduces the time of the initial process step, but patients just wait longer for the physician. The EAU moves the work to a parking lot, requires new staff and actually serves to extend the length of stay, which worsened the gridlock.
- Central triage: The workload referral hand-off between primary care and specialty care has been arbitrary and fraught with customization, informality and variation, resulting in inevitable dissatisfaction, errors and delays. The development of a central triage unit to manage the workflow by creating a single standardized entry point and process is an attempt to reduce the variation, dissatisfaction and error. At the same time, the incorporation of formal "priority" as an inherent part of the new process actually maintains a high number of distinct channels of work, resulting in a higher likelihood that the "second sickest" queue will be delayed past the recommended threshold. Even though some significant improvements are achieved, neglecting to "see" that the creation of more priority queues will result in more error and delay actually serves to continue to sub-optimize overall system performance.

All the improvement methodologies listed and discussed above contain strategies crafted toward three potential objectives: reduce demand, increase or enhance supply, or create a more effective match of demand to supply, primarily through the reduction of variation. Successful organizational improvement utilizes all or any of the strategies, linking them through the integrated lens of explicit demand/supply matching.

Successful integration then requires a linkage of all the various methods used as a framework to guide improvement work. In addition, successful integration requires linking the four pillars that frame the

integrating services initiative: people-centered care, reduction of variation, a focus on the care continuum and improvement in process management. In order to integrate these approaches into a unified whole, the fundamental dynamic of matching demand to supply must be made explicit.

#### **Review Questions**

- 1. Define the Demand in health care services?
- 2. Explain the Supply in health care services?
- 3. Discuss the ways for building Demand in Health Services?
- 4. Explain the People-Centred Care?

#### **Discussion Questions**

Discuss the Process Improvement and Supply and Demand in Health care services?

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Jorethang, District Namchi, Sikkim- 737121, India www.eiilmuniversity.ac.in