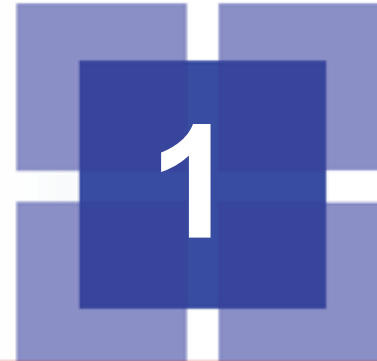


Introduction of Software Engineering Economy



CHAPTER

When you have completed your study of this chapter, you will be able to

- 1** Define economics and explain the questions that economists try to answer.
- 2** Explain the kinds of questions that define the economic way of thinking.



You're in school!

Did you make the right decision?

1.1 DEFINITION AND QUESTIONS

All economic questions and problems arise because human wants exceed the resources available to satisfy them.

■ Scarcity

Scarcity is the condition that arises because wants exceeds the ability of resources to satisfy them.

Faced with scarcity, we must make *choices*—we must *choose* among the available alternatives.

The choices we make depend on the incentives we face.

1.1 DEFINITION AND QUESTIONS

■ Economics Defined

Economics is the social science that studies the choices that individuals, businesses, governments, and entire societies make as they cope with *scarcity*, the *incentives* that influence those choices, and the arrangements that coordinate them.

1.1 DEFINITION AND QUESTIONS

Economics divides into two parts:

Microeconomics: The study of the choices that individuals and businesses make and the way these choices interact and are influenced by governments.

Macroeconomics: The study of the aggregate (or total) effects on the national economy and the global economy of the choices that individuals, businesses, and governments make.

1.1 DEFINITION AND QUESTIONS

Two big economic questions:

- How do choices determine *what*, *how*, and *for whom* goods and services get produced?
- When do choices made in *self-interest* also promote the *social interest*?

1.1 DEFINITION AND QUESTIONS

■ What, How, and For Whom?

Goods and services are the objects (goods) and actions (services) that people value and produce to satisfy human wants.

What goods and services get produced and in what quantities?

How are goods and services produced?

For Whom are the various goods and services produced?

1.1 DEFINITION AND QUESTIONS

■ When Is the Pursuit of Self-Interest in the Social Interest?

The choices that are best for the individual who makes them are choices made in the pursuit of **self-interest**.

The choices that are best for society as a whole are choices made in the **social interest**.

1.1 DEFINITION AND QUESTIONS

Can choices made in self-interest also serve the social interest?

Let's illustrate with four topics:

1 Globalization

Globalization—the expansion of international trade and the production of components and services by firms in other countries—has been going on for centuries.

1.1 DEFINITION AND QUESTIONS

But in recent years, its pace accelerated.

Microchips, satellites, and fiber-optic cables have lowered the cost of communication.

This explosion of communication has globalized production decisions.

For example, Nike produces shoes in Malaysia; Toyota produces cars in the United States.

Globalization is in the interest of the owners of multinational firms that profit, but is it in the social interest?

1.1 DEFINITION AND QUESTIONS

2 The Information Age

Makers of computer chips and software programs developed products in their self-interest, but did they develop their products in the social interest?

1.1 DEFINITION AND QUESTIONS

表 1 2007 年与 2017 年全球市值最高的十家企业比较

2007 年		2017 年	
企业名	市值 (10 亿美元)	企业名	市值 (10 亿美元)
埃克森美孚	467	苹果	815
通用电器	394	Alphabet	637
微软	265	微软	558
中国工商银行	259	脸书	485
花旗集团	243	亚马逊	461
AT&T	238	伯克希尔·哈撒韦	438
皇家荷兰壳牌	232	阿里巴巴	415
美国银行	230	腾讯	394
中国石油	225	强生	357
中国移动	207	埃克森美孚	323

注：本数据分别来自 2007 年和 2017 年第二季度数据，根据各企业财报整理。标阴影的企业为平台型企业。

1.1 DEFINITION AND QUESTIONS

Question

Why are the top 10 global companies changing?

Answer

Friction-Free Economy

1.2 THE ECONOMIC WAY OF THINKING

■ Economic Ideas:

- Choice is a tradeoff
- People make rational choices
- Benefit is what you gain from something
- Cost is what you must give up to get something
- Most choices are made at the margin
- Choices respond to incentives

1.2 THE ECONOMIC WAY OF THINKING

■ A Choice Is a Tradeoff

Because we face scarcity we must make choices.

To make a choice we select from alternatives.

Whatever choice you make, you could have chosen something else.

You can think about your choices as tradeoffs.

A **tradeoff** is an exchange—giving up one thing to get something else.

1.2 THE ECONOMIC WAY OF THINKING

■ Rational Choice

A **rational choice** is a choice that uses the available resources to best achieve the objective of the person making the choice.

We make rational choices by comparing *costs* and *benefits*.

1.2 THE ECONOMIC WAY OF THINKING

■ Benefit: What You Gain

Benefit is the gain or pleasure that something brings.

Benefit is measured by what you are *willing to give up*.

■ Cost: What You *Must* Give Up

Opportunity cost is the best thing that you *must* give up to get something—the highest-valued alternative forgone.

1.2 THE ECONOMIC WAY OF THINKING

■ How Much? Choosing at the Margin

A choice made at the **margin** is a choice made by comparing *all* the relevant alternatives systematically and incrementally.

1.2 THE ECONOMIC WAY OF THINKING

Marginal Cost

Marginal cost is the opportunity cost of a one-unit increase in an activity.

The marginal cost of something is what you *must* give up to get *one additional* unit of it.

Marginal Benefit

Marginal benefit is the what you gain when you get one more unit of something.

The marginal benefit of something is *measured* by what you *are willing* to give up to get *one additional* unit of it.

1.2 THE ECONOMIC WAY OF THINKING

Making a Rational Choice

You make a rational choice when you take those actions for which marginal benefit exceeds or equals marginal cost.

■ Choices Respond to Incentives

An **incentive** is a reward or a penalty—a “carrot” or a “stick”—that encourages or discourages an action.

1.2 THE ECONOMIC WAY OF THINKING

■ Economics as a Social Science

Economists try to understand and predict the effects of economic forces by using the *scientific method* first developed by physicists.

The scientific method is a common sense way of systematically checking what works and what doesn't work.

An economist begins with a question or a puzzle about cause and effect arising from some observed facts.

1.2 THE ECONOMIC WAY OF THINKING

Economic Models

An economist's second step is to build a model that provides a possible answer to the question of interest.

An **economic model** is a description of some feature of the economic world that includes only those features assumed necessary to explain the observed facts.

Check Models Against Facts

An economist's third step is to check the proposed model against the facts.

1.2 THE ECONOMIC WAY OF THINKING

To check an economic model against the facts, economists use

- Natural experiments
- Statistical investigations
- Economic experiments

Natural experiments: A situation that arises in the ordinary course of economic life in which the one factor of interest is different and other things are equal.

1.2 THE ECONOMIC WAY OF THINKING

A statistical investigation looks for a correlation.

Correlation is the tendency for the values of two variables to move together in a predictable and related way.

An economic experiment puts people in a decision-making situation and varies the influence of one factor at a time to discover how they respond.

1.2 THE ECONOMIC WAY OF THINKING

Disagreement: Normative versus Positive

Economists sometimes disagree about assumptions and models and also about what policy to use.

Some disagreements can be settled by appealing to further facts, but others cannot.

Disagreements that can't be settled by facts are *normative statements*—statements about what *ought to be*.

Disagreements that *can* be settled by facts are *positive statements*—statements about *what is*.

1.2 THE ECONOMIC WAY OF THINKING

■ Economics as Policy Tool

Economics provides a way of approaching problems in all aspects of our lives: personal, business, and government.



In-Class Experiment

Did You Make the Right Decision?

Does school provide a big enough benefit to justify its cost?

The **benefits** of being in school include the present enjoyment of student life and a higher future income.

The **costs** of being in school for a full-time student include tuition, books, other study costs, and forgone earnings.

Is school always best?

The costs are incurred now, but the benefits accrue over a working lifetime.

For most people, the net benefit is big!



Case Study

Did They Make the Right Decision?

Is school always best?

Bill Gates quitted Harvard;

Steve Jobs turned down a scholarship at Stanford;

All two expected the benefit from school to be less than the opportunity cost of being in school.



Conclusion

Key Terms

Scarcity,
Correlation,
Economics,
Economic model,
Incentive,
Margin,
Marginal benefit,
Marginal cost,
Opportunity cost,
Rational choice,
Self-interest,
Social interest,
Tradeoff,



Assignments

Three types of homework

Thinking questions

Referring the definition of **economics**, trying to give the definition of **software engineering economics**.

This exercises will be discussed in the next lessons. You should not submit this exercise to the teacher.

Preview

Chapter 4 Demand and Supply

from the reference book “Essential Foundations of Economics 6th Edition, written by Robin Bade and Michael Parkin.

Exercise

Clicker Questions of Chapter One,

Stored as the name of [Ch01_Clicker Questions](#) in my document fold.