Global and Southern African Perspectives

Economics

3rd Edition

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The firm's decisions

To achieve the objective of maximum economic profit, a firm must make five decisions:

1. What can it produce and in what quantities?
2. How does it produce?
3. How can it organise and compensate its managers and workers?
4. How can it market and price its products?
5. What can it produce itself and buy from others.

In all these decisions, a firm's actions are limited by the constraints that it faces. Your next task is to learn about these constraints.

The firm's constraints

Three features of a firm's environment limit the maximum economic profit it can make. They are:

- technology constraints
- information constraints
- market constraints.

Technology constraints Economists define technology broadly. A **technology** is any method of producing a good or service. Technology includes the detailed designs of machines and the layout of the workplace. It includes the organisation of the firm. For example, the shopping mall is one technology for producing retail services. It is a different technology from the online store, which in turn is different from the corner store.

It might seem surprising that a firm's profit is limited by technology because it seems that technological advances are constantly increasing profit opportunities. Almost every day, we learn about some new technological advance that amazes us. With computers that speak and recognise our own speech and cars that can find the address we need in a city we have never visited, we can accomplish more than ever.

Technology advances over time. But at each point in time, to produce more output and gain more revenue, a firm must hire more resources and incur greater costs. The increase in profit that a firm can achieve is limited by the technology available. For example, by using its current plant and workforce, Toyota can produce a certain number of cars per day. To produce more cars per day, Toyota must hire more resources, which increases its costs and limits the increase in profit that it can make by selling the additional cars.

Information constraints We never possess all the information we would like to have to make decisions.

We lack information about both the future and the present. For example, suppose you plan to buy a new computer. When should you buy it? The answer depends on how the price is going to change in the future. Where should you buy it? The answer depends on the prices at hundreds of different computer stores.

To get the best deal, you must compare the quality and prices in every store. But the opportunity cost of this comparison exceeds the cost of the computer!

A firm is constrained by limited information about the quality and efforts of its workforce, the current and future buying plans of its customers and the plans of its competitors. Workers might make too little effort, customers might switch to competing suppliers and a competitor might enter the market and take some of the firm's business.

To address these problems, firms create incentives to boost workers' efforts even when no one is monitoring them; conduct market research to lower uncertainty about customers' buying plans and 'spy' on each other to anticipate competitive challenges. But these efforts do not eliminate incomplete information and uncertainty, which limit the economic profit that a firm can make.

Market constraints The quantity each firm can sell and the price it can obtain are constrained by its customers' willingness to pay and by the prices and marketing efforts of other firms. Similarly, the resources that a firm can buy and the prices it must pay for them are limited by the willingness of people to work for and invest in the firm. Firms spend billions of rand a year marketing and selling their products. Some of the most creative minds strive to find the right message that will produce an attention-grabbing television advertisement. Market constraints and the expenditures firms make to overcome them limit the profit a firm can make.

REVIEW QUIZ

1. What is a firm's fundamental goal and what happens if the firm does not pursue this goal?
2. Why do accountants and economists calculate a firm's cost and profit in different ways?
3. What are the items that make opportunity cost differ from the accountant's measure of cost?
4. Why is normal profit an opportunity cost?
5. What are the constraints that a firm faces? How does each constraint limit the firm's profit?

In the rest of this chapter and in Chapters 11 to 14, we study the choices that firms make. You are going to learn how we can predict a firm's decisions as those that maximise profit given the constraints the firm faces. We begin by taking a closer look at a firm's technology constraints.

Technological and economic efficiency

Microsoft employs a large workforce and most Microsoft workers possess a large amount of human capital. But the firm uses a small amount of physical capital. In contrast, a coal-mining company employs a huge amount of mining equipment (physical capital) and almost no labour. Why?

The answer lies in the concept of efficiency. There are two concepts of production efficiency: technological efficiency and economic efficiency. **Technological efficiency** occurs when the firm produces a given output by using the least amount of inputs. **Economic efficiency** occurs when the firm produces a given output at the least cost. Let us explore the two concepts of efficiency by studying an example.

Suppose that there are four alternative techniques for making TVs:

A. *Robot production*. One person monitors the entire computer-driven process.

B. *Production line*. Workers specialise in a small part of the job as the emerging TV passes them on a production line.

C. *Hand-tool production*. A single worker uses a few hand tools to make a TV.

D. *Bench production*. Workers specialise in a small part of the job but walk from bench to bench to perform their tasks.

Table 10.2 sets out the amounts of labour and capital required by each of these four methods to make 10 TVs a day.

Which of these alternative methods are technologically efficient?

Technological efficiency

Recall that *technological efficiency* occurs when the firm produces a given output by using the least amount of inputs. Look at the numbers in the table and notice that method *A* uses the most capital and the least labour. Method *C* uses the most labour and the least capital. Method *B* and method *D* lie between the two extremes. They use less capital and more labour than method *A* and less labour but more capital than method *C*.

Compare methods *B* and *D*. Method *D* requires 100 workers and 10 units of capital to produce 10 TVs.

TABLE 10.2 Four ways of making 10 TVs a day

		Quantities of inputs	
	Method	Labour	Capital
A	Robot production	1	1 000
B	Production line	10	10
C	Hand-tool production	1 000	1
D	Bench production	100	10

Those same 10 TVs can be produced by method *B* with 10 workers and the same 10 units of capital. Because method *D* uses the same amount of capital and more labour than method *B*, method *D* is not technologically efficient.

Are any of the other methods not technologically efficient? The answer is no. Each of the other methods is technologically efficient. Method *A* uses more capital but less labour than method *B*, and method *C* uses more labour but less capital than method *B*.

Which of the methods are economically efficient?

Economic efficiency

Recall that *economic efficiency* occurs when the firm produces a given output at the least cost.

Method *D*, which is technologically inefficient, is also economically inefficient. It uses the same amount of capital as method *B* but 10 times as much labour, so it costs more. A technologically inefficient method is never economically efficient.

One of the three technologically efficient methods is economically efficient. The other two are economically inefficient. But which method is economically efficient depends on factor prices.

In Table 10.3(a), the wage rate is R75 per day and the rental rate of capital is R250 per day. By studying Table 10.3(a), you can see that method *B* has the lowest cost and is the economically efficient method.

In Table 10.3(b), the wage rate is R150 a day and the rental rate of capital is R1 a day. Looking at Table 10.3(b), you can see that method *A* has the lowest cost and is the economically efficient method. In this case, capital is so cheap relative to labour that the method that uses the most capital is the economically efficient method.

In Table 10.3(c), the wage rate is R1 a day and the rental rate of capital is R1 000 a day. You can see that method *C* has the lowest cost and is the economically efficient method. In this case, labour is so cheap relative to capital that the method that uses the most labour is the economically efficient method.

Economic efficiency depends on the relative costs of resources. The economically efficient method is the one that uses a smaller amount of the more expensive resource and a larger amount of the less expensive resource.

A firm that is not economically efficient does not maximise profit. Natural selection favours efficient firms and inefficient firms disappear. Inefficient firms go out of business or are taken over by firms that produce at lower costs.

TABLE 10.3 The costs of different ways of making 10 TVs a day

(a) Wage rate R75 per day; capital rental rate R250 per day

Method	Inputs		Labour cost (R75 per day)		Capital cost (R250 per day)		Total cost (R)
	Labour	Capital					
A	1	1 000	75	+	250 000	=	250 075
B	10	10	750	+	2 500	=	3 250
C	1 000	1	75 000	+	250	=	75 250

(b) Wage rate R150 per day; capital rental rate R1 per day

Method	Inputs		Labour cost (R150 per day)		Capital cost (R1 per day)		Total cost
	Labour	Capital					
A	1	1 000	150	+	1 000	=	1 150
B	10	10	1 500	+	10	=	1 510
C	1 000	1	150 000	+	1	=	150 001

(c) Wage rate R1 per day; capital rental rate R1 000 per day

Method	Inputs		Labour cost (R1 per day)		Capital cost (R1 000 per day)		Total cost
	Labour	Capital					
A	1	1 000	1	+	1 000 000	=	1 000 001
B	10	10	10	+	10 000	=	10 010
C	1 000	1	1 000	+	1 000	=	2 000

REVIEW QUIZ

1. Is a firm technologically efficient if it uses the latest technology? Why or why not?
2. Is a firm economically inefficient if it can cut its costs by producing less? Why or why not?
3. Explain the key distinction between technological efficiency and economic efficiency.
4. Why do some firms use large amounts of capital and small amounts of labour while others use small amounts of capital and large amounts of labour?

Next we study the information constraints that firms face and the wide array of organisation structures these constraints generate.

Information and organisation

Each firm organises the production of goods and services by combining and coordinating the productive resources it hires. But there is variety across firms in how they organise production. Firms use a mixture of two systems:

- command systems
- incentive systems.

Command systems

A **command system** is a method of organising production that uses a managerial hierarchy.

Commands pass downward through the hierarchy and information passes upward. Managers spend most of their time collecting and processing information about the performance of the people under their control and making decisions about what commands to issue and how best to get those commands implemented. The army of any nation is the purest form of a command system.

Command systems in firms are not as rigid as those in the military, but they share some similar features. A chief executive officer (CEO) sits at the top of a firm's command system. Senior executives who report to and receive commands from the CEO specialise in managing production, marketing, finance, personnel and perhaps other aspects of the firm's operations. Beneath these senior managers might be several tiers of middle management ranks that stretch downward to the managers who supervise the day-to-day operations of the business. Beneath these managers are the people who operate the firm's machines and who make and sell the firm's goods and services.

Small firms have one or two layers of managers, while large firms have several layers. As production processes have become ever more complex, management ranks have swollen. Today, more people have management jobs than ever before, even though the information revolution of the 1990s slowed the growth of management. In some industries, the information revolution reduced the number of layers of managers and brought a shakeout of middle managers.

Managers make enormous efforts to be well informed. They try hard to make good decisions and issue commands that end up using resources efficiently. But managers always have incomplete information about what is happening in the divisions of the firm for which they are responsible. For this reason, firms use incentive systems, as well as command systems to organise production.

Incentive systems

An **incentive system** is a method of organising production that uses a market-like mechanism inside the firm. Instead of issuing commands, senior managers create compensation schemes to induce workers to perform in ways that maximise the firm's profit.

Selling organisations use incentive systems most extensively. Sales representatives who spend most of their working time alone and unsupervised are induced to work hard by being paid a small salary and a large performance-related bonus.

But incentive systems operate at all levels in a firm. The compensation plan of a CEO includes a share in the firm's profit, and factory floor workers sometimes receive compensation based on the quantity they produce.

Mixing the systems

Firms use a mixture of commands and incentives and they choose the mixture that maximises profit. Firms use commands when it is easy to monitor performance or when a small deviation from an ideal performance is very costly. They use incentives when it is either not possible to monitor performance or too costly to be worth doing.

For example, PepsiCo can easily monitor the performance of workers on a production line. If one person works too slowly, the entire line slows, so a production line is organised with a command system.

In contrast, it is costly to monitor a CEO. For example, what did Steve Jobs, the former CEO of Apple Inc., contribute to Apple's success? This question cannot be answered with certainty, yet Apple's shareholders have to put someone in charge of the business and provide that person with an incentive to maximise shareholders' returns. The performance of Apple illustrates a general problem, known as the principal–agent problem.

The principal–agent problem

The **principal–agent problem** is the problem of devising compensation rules that induce an *agent* to act in the best interest of a *principal*. For example, the shareholders of Pick n Pay are *principals* and the firm's managers are *agents*. The shareholders (the principals) must induce the managers (agents) to act in the shareholders' best interest. Similarly, Steve Jobs (a principal) must induce the designers who are working on the next generation iPhone (agents) to work efficiently.

Agents, whether they are managers or workers, pursue their own goals and often impose costs on a principal. For example, the goal of shareholders of Standard Bank (principals) is to maximise the firm's profit – its true profit, not some fictitious paper profit. But the firm's profit depends on the actions of its managers (agents) and they have their own goals.

Perhaps a bank manager takes a customer to a rugby game on the pretence that she is building customer loyalty, when in fact she is simply enjoying on-the-job leisure. This same manager is also a principal and her tellers are agents. The manager wants the tellers to work hard and attract new customers so that she can meet her operating targets. But the workers enjoy conversations with each other and take on-the-job leisure.

Nonetheless, the firm constantly strives to find ways of improving performance and increasing profits.

Coping with the principal–agent problem

Issuing commands does not address the principal–agent problem. In most firms, the shareholders cannot monitor the managers and often the managers cannot monitor the workers. Each principal must create incentives that induce each agent to work in the interests of the principal. Three ways of attempting to cope with the principal–agent problem are:

- ownership
- incentive pay
- long-term contracts.

Ownership By assigning ownership (or part-ownership) of a business to managers or workers, it is sometimes possible to induce a job performance that increases a firm's profits. Part-ownership is quite common for senior managers but less common for workers. Stellar Wines in the Northern Cape province of South Africa is an example of management passing ownership to workers. Workers now own 26 per cent of the business, and their share is increasing every year.

Incentive pay Incentive pay – pay related to performance – is very common. Incentives are based on a variety of performance criteria such as profits, production or sales targets. Promoting an employee for good performance is another example of the use of incentive pay.

Economics in Action

Principals and agents at Apple

Missed targets take a bite out of Apple chiefs' pay
The iPhone, launched in 2006, made Apple the world's most valuable company and its 2014 and 2015 profits were at an all-time high.

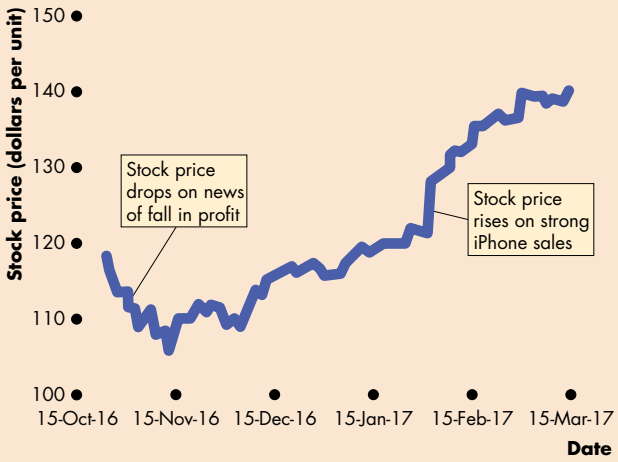

Figure 1 Apple's stock price

But in 2016, when the iPhone 6s missed revenue and profit targets, CEO Tim Cook and other top executives took pay cuts. Although Mr. Cook's annual salary and bonuses fell in 2016 (from $10.3m to $8.7m), the value of his longer term stock awards increased as the price of Apple stock rose in 2017.

Source: *Financial Times*, January 6, 2017

The questions

- Who are the principals and who are the agents?
- How does Apple try to cope with its principal–agent problem?
- On the occasion reported here, why did Tim Cook take a pay cut?
- What role did Apple's stock price play?

The answers

- The Apple stockholders are principals and Tim Cook is their agent.
- Tim Cook, as CEO, is a principal and the top executives are agents.
- Apple top executives are principals, and the employees who design iPhone upgrades and marketing programmes are agents.
- Apple tries to cope with the principal–agent problem by compensating agents with performance bonuses, profit shares through stock options, and with the possibility of salary and bonus cuts for missed targets.
- Tim Cook took a cut in his salary and bonus because the iPhone 6s underperformed and Apple missed its revenue and profit targets.
- Apple's stock price fell in November 2016, which not only lowered the wealth of stockholders but also lowered the compensation of Tim Cook and the other executives compensated with stock options. But the 2017 stock-price increase (see Figure 1) quickly reversed the losses and the effects of the pay cuts.

Long-term contracts Long-term contracts tie the long-term fortunes of managers and workers (agents) to the success of the principal(s) – the owner(s) of the firm. For example, a multi-year employment contract for a CEO encourages that person to take a long-term view and devise strategies that achieve maximum profit over a sustained period.

These three ways of coping with the principal–agent problem give rise to different types of business organisation. Each type of business organisation is a different response to the principal–agent problem. Each type uses a different combination of ownership, incentives and long-term contracts. Let us look at the main types of business organisation.

Types of business organisation

The three main types of business organisation are:

- sole proprietorship
- close corporation (CC)
- private company (Pty) Ltd.

Sole proprietorship A *sole proprietorship* is a firm with a single owner – a sole trader – who has unlimited liability.

Unlimited liability is the legal responsibility for all the debts of a firm up to an amount equal to the entire wealth of the owner. If a proprietorship cannot pay its debts, those to whom the firm owes money can claim the personal property of the owner. Businesses of some farmers, computer programmers and artists are examples of proprietorships.

The proprietor makes management decisions, receives the firm's profits and is responsible for its losses. Profits from a sole proprietorship are taxed at the same rate as other sources of the proprietor's personal income.

Close corporation (CC) A *close corporation* is a separate legal entity that was one of the most popular structures in South Africa where the owners have limited liability. CCs were popular because they were cost-effective and constituted a simple business entity under which to conduct business. In May 2011 the Companies Act No. 71 of 2008 was introduced, replacing the Companies Act No. 61 of 1973 and the Close Corporations Act No. 69 of 1984. Existing CCs do not have to change to private companies, but government wants new companies to register as private companies (Pty Ltds) or personal liability companies (Incs). Under the old Close Corporations Act of 1984, CCs could have up to 10 members but all needed to be natural persons (trusts could be members under certain conditions). The profits of a CC are taxed at 28 per cent. At the time of writing, the South African Revenue Service (SARS) had a special dispensation for close corporations and private companies that employed a minimum of 3 people. The first R300 000 annual profit would be taxed at 10 per cent, allowing the business a potential tax saving of a maximum value of R60 000.