The Firm and Production

I. The Organization of Firms

The purpose of this section is to discuss how firms are organized. Firm organization may affect the ability of the firm to fulfill its goals by its impact upon financial capital and upon business choices of the firm.

A. Three different types of Firms

1. Single Proprietorship

A single proprietorship is a firm that is owned by a single individual. Legally, the firm has no existence apart from the individual. Hence, we can all become such a firm by simply declaring our existence as a firm. Single proprietorships may have multiple employees but the single owner controls the firm.

Advantages of Single Proprietorship

- The main advantage of a single proprietorship is that the single owner is the sole decision maker and has control over the firm. This minimizes controversy and disputes over making decisions (but does not eliminate them if employees are present.)

Disadvantages of Single Proprietorship

- Difficulty raising financial capital. A single owner generally means that there exists only one person willing to invest in the firm – which tends to severely limit the amount of financial capital that the single owner can raise to initially start and run the firm.
- The size of the firm. Single proprietorships tend to be relatively small firms, partially because of the problem with raising financial capital. A single decision maker in the firm also limits the size of the firm as well.
- Unlimited liability. One of the major problems with a single proprietorship is that the owner of the firm has unlimited liability for firm actions. That is, although the owner may view assets as belonging to either the firm or to him, individually, no such legal distinction exists. All assets are treated exactly the same. Which means that the individual's "personal" assets are legally liable in legal action against the firm.

2. Partnership

A partnership occurs when two or more individuals pool their assets and become joint owners of a firm. Such a firm does require some form of partnership agreement between the joint owners but is relatively easy to create. In a partnership, all owners make binding decisions for the firm.

Advantages of Partnerships

- Increased ability to raise financial capital. Clearly one of the major advantages of a partnership is the ability to raise more financial capital from the additional owners.

- The size of the firm. The additional owners, both through increased ability to raise financial capital but also through the increased number of decision makers increase the size of the firm.

Disadvantages of Partnerships

- Control of the firm. Additional owners raise the likelihood of increased conflict within the firm about firm goals and decisions.
- Unlimited liability. Owners of partnerships still have unlimited liability with personal assets liable to bad decisions within the firm. In fact, the problem of unlimited liability is even more severe than for single proprietorships because now an owner is liable for not only his own decisions within the firm, as was true in a single proprietorship but is also liable for decisions made by other owners.

3. Corporation

Corporations are firms that legally exist separate from their owners. Corporations can legally do many of the same things that individuals can do – sue and be sued, enter into contracts, and so forth. Of course, there exist a few things that individuals can do that corporations cannot – marriage is one such.

There exist two types of corporations: privately and publicly held corporations. Most private corporations tend to be quite small. Ownership in the firm is limited to a selected group of individuals, which tends to be small, and cannot be publicly traded. In contrast, in publicly held corporations ownership of the corporation is available for the public to buy and sell in open markets called stock markets.

Advantages of Corporations

- Limited liability. The main advantage, and purpose, of corporations is to limit liability to its owners. For partnerships and proprietorships, owners have unlimited liability <u>because</u> the firm has no legal existence except through its owners. Hence, the owners must be liable for firm actions. However, the legal existence of corporations serves to legally insulate owners from personal liability for firm actions. Of course, owners are still liable for the value of their ownership in the firm. Owners are also, as we all are, potentially liable for their own actions. But owners are not liable for the actions of others within the firm except through the impact such liability has upon the value of the firm.
- Increased ability to raise financial capital. Corporations are relatively recent innovations in the business world. Essentially, corporations were an innovation of the industrial revolution where large firms became not only economically viable but also necessary to produce efficiently. The ability to limit liability to only that invested in a firm increases the ability of the firm to raise financial capital from potential investors.

Disadvantages of Corporations

- Control of the firm. Owners of corporations may have even less control over the firm than is the case for partnerships. Buying a share of stock, ownership, in a large multinational firm yields such a small percentage of total ownership that effective control is difficult to achieve. Of course, the problem of control is more difficult with larger firms. Owners in large firms do have

some ability to control the firm by selling their stock. But only if enough owners do likewise, driving down prices.

- Double taxation. Paying taxes is one of the things that many legal entities, including corporations, "get" to do. In fact, corporate income is taxed twice as compared to partnership and proprietorship income, once when the corporation realizes the income and a second time when the corporation distributes the remaining money to its owners.

B. Definitions Regarding Firms

- Sources of Capital for Firms

  Understanding where firms obtain financial capital, money, for their operations is much easier if students will begin by simply thinking about where they obtain money to buy consumer goods. For example, most consumers primarily obtain income from two sources, working (selling their labor) and borrowing money.

  Firms obtain money similarly, not by selling their labor because they do not own labor, but by selling the products that they produce. Although discussed in more detail below, their earnings from this activity that are used to finance firm operations and expansion are called **retained earnings**.

  Similar to consumers, firms can also borrow money to finance their operations or expansion. Such borrowing can take one of two possible forms. First, similar to consumers, firms may simply obtain a loan from a bank or similar financial institution. This type of borrowing is known as debt financing. However, some firms, generally those that tend to be large and stable, may also avail themselves of another type of borrowing. They may issue bonds.

  Banks obtain money to lend by paying interest to depositors. That is, banks serve the economic function of being the middlemen between those who wish to invest money and those who wish to borrow money. A firm who issues bonds is essentially cutting out these middlemen, the banks, from the process by going directly to the investors.

  The firm can go to the investor by issuing a bond. A bond is piece of paper that includes the amount of money that the bond is initially worth, known as the principal. The bond also includes the term of the bond, measured in months or years. At the end of the term the bond stipulates that the principal will be repaid, just as occurs when a loan comes due. Finally, the bond also includes an interest rate that accrues to the bond owner during the life of the bond. A firm issuing bonds then sells them on the market to anyone wishing to buy them. Bond markets work just as do other markets; with prices of bonds rising and falling as demand and supply factors change.

  Finally, firms can raise financial capital by selling ownership in the firm in the form of stock. A share of stock is also a piece of paper, but in this case one that represents a share of ownership in the firm. Ownership of stock gives rights to some limited control of the firm, *e.g.*, the right to vote in stockholder meetings. Stock ownership also gives the stockholder shares of firm earnings.

Notice that selling stock to raise financial capital can only occur once. That is, once the firm has sold the ownership it now belongs to those who bought them and not the firm. If the value of the firm rises, so will the prices of its stock. The only way that the firm can take advantage of such increased prices is to hold some shares of stock in reserve.

Notice that we have discussed four methods that firms may utilize in order to raise financial capital.

1. Retained Earnings
2. Debt Financing
3. Issue Bonds
4. Sale of Stock

- How do Firms make Decisions?

  In this course, we will assume that all firms have the same goal – **profit maximization** – even though the firms are organized very differently. Thus, firms are assumed to make decisions in a manner calculated to maximize profits. Exactly how profit maximization decisions occur will be discussed in more detail in a later chapter.

  However, a brief note regarding this assumption is useful at this point. Recall that one of the disadvantages of more complexity in firm organization – as the firm moves from a proprietorship, to a partnership, to a corporation – is that firm owners lose control over the firm. Ultimately, in a large corporation ownership of a single share of stock, out of millions of shares, leads to very little effective control of the firm.

  The assumption of profit maximization is not hard to justify for firm owners. However, the loss of control by owners in large and complex firms leads to the possibility that those who manage the firm will have different goals than the owners. As a result, firm owners often give managers incentives to maximize profits by, for example, tying the managers' salary to the firm's profits via incentive bonuses or stock options. Although we will not discuss this problem throughout the rest of the course, it is an important issue and is addressed in more detail in the branch of economics that deals with such issues, known as **Industrial Organization**.

- How does a Firm use its Profits?

  Once a firm has profits, what can it do with those profits? Basically, there are three things that firms do with their profits. First, they must pay taxes to the government, as discussed above, just like consumers. The obligation to pay taxes legally comes first before all other considerations.

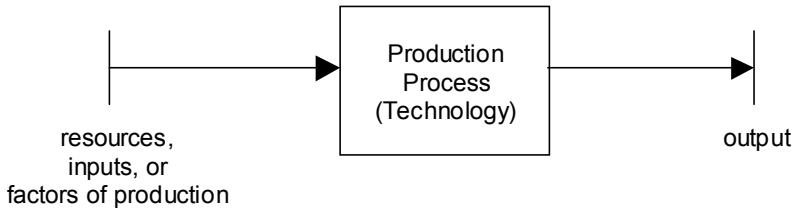
  Second, the firms can disperse profits to firm owners. Such payments are known as **dividends**. Finally, the profits that have not been paid to the government in taxes or paid as dividends to owners remain within the firm and are known as **retained earnings**. Recall, that we discussed retained earnings above as one source of money for the firm to expand.

II. Definitions

In this section, we'll present some definitions that will be very useful in our discussion of firms and their behavior.

A. Production

Recall that at the beginning of the semester we defined production with the use of a flow chart:



Graph 1

Again, four types of resources (labor, capital, land – natural resources, and entrepreneurship) go into a production process, which when combined together in that production process yields an output.

Using the flow chart to explain production has the advantage of simplicity – it's easy to understand the basic idea of production. However, it has the disadvantage of not being as useful in what comes next in our discussion of firms – carefully describing how firms make production decisions. Instead of using the flow diagram, we will rely upon the production function.

- The Production Function

  A function is a mathematical concept. Functions simply describe the impact of one or more variables upon another variable. The main advantage of using a function when discussing production is that rules about functions have been well developed mathematically. That is, a production function is more precise and hence more understandable than the simple flow chart presented above. However, in their essence both the production flow chart and the production function are the same. Mathematically, a general production function is simply represented by the following equation:

  $$Q = f(L, K, N, E) \qquad (1)$$

  The production function in equation 1 has exactly the same elements and relationships as the production flow chart in Graph 1. Both have inputs or resources (L, K, N, and E). Both have an output, labeled as "Q" in equation 1. Finally, both have a production process, which represents the method in which the inputs are combined to produce the output. In equation 1 the production process is given by the function itself – the f(….) symbol.

  In words equation 1 reads as follows: output (Q) is a function of labor, capital, natural resources, and entrepreneurship. Notice that equation 1 still leaves open the relationship between inputs and outputs. Defining exactly the relationship between inputs and output is one of the important tasks to be completed in the next chapter.

- When Does Production Occur?

  The question about when production occurs strikes at the heart of what is meant by the word "production". Essentially, we want to know when a firm is engaging in productive activities and when it is not. For example, most people would agree that what Chevrolet does when it creates a new car – an object that is useful and did not exist before the firm put together resources – is production.

  People do, however, often disagree about whether other types of activities by firms are truly production. For example, does the car dealership that sells the car that Chevrolet produced above also engage in production? To answer that question, we can simply look back at our production function in equation 1 and ask whether the car dealership is engaging in an activity that resembles that production function. First, is the car dealership using inputs or resources as required by our understanding of production? Clearly, the firm does use inputs – they have a building and lot (capital), they pay workers such as the salesman who annoys you (labor) and so forth.

  However, to qualify as production the firm must do more than just use inputs; the firm must also produce an output. What does the car dealership produce? Clearly, they did not produce the car they are selling – Chevrolet did that. In point of fact, the dealership does not produce anything that is tangible in this instance, a fact that leads some to conclude that they did not produce anything. That conclusion, however, is incorrect. What the dealership produced, while intangible, is as real as the car that Chevrolet produced. They produced a service, assisting in moving the car from a low-valued user (Chevrolet) to a high-valued user (the consumer), and thereby helping to increase everyone's utility.

  Thus, our definition of production must include both the possibility that the output is a tangible good, such as a car, but also other types of intangible goods, such as the service provided by the car dealer. We will use the following definition of production:

  > Production occurs whenever resources (goods) are transformed to make them more valuable. There exist four general methods by which this process can occur: The resources (goods) can be made more valuable in:
  >
  > 1. Form – that is, the firm can produce something that did not previously exist. This is what Chevrolet does when it produces a new car.
  >
  > 2. Possession – that is, the firm can help the process of exchange serving as a middleman by finding consumers who wish to buy a good for a firm who wishes to sell a good. This is what our car dealership does when it sells a car.
  >
  > 3. Place – that is the firm can help the process of exchange by transporting goods from an area where they are abundant and, hence, less valuable, to another area where they are less abundant and more valuable. For example, a firm that transports apples from Washington State to another location is engaging in this type of production.
  >
  > 4. Time – this type of production is similar to making a good more valuable in place, usually through transportation. However, in this

case the transportation takes place over time. For example, production of agricultural products like potatoes takes place seasonally, with planting occurring in the spring and harvesting in the fall. Even though all the potatoes have been produced at essentially the same time, consumers don't desire to consume all of the potatoes at the same time. Hence, a firm that stores the potatoes is essentially transporting them from a time when they are more abundant to a time when they are less abundant and hence more valuable.

B. Time and Production

We learned in our discussion of Supply that production is a flow variable. That is, production does not occur instantaneously but occurs over a period of time. As a result, the time period affects production. We define three different time periods related to production:

- The Short-Run in Production

  The short-run is a period of time during which at least one input cannot be changed. Thus, in the short-run some resources are fixed.

  Often, but not always, capital is an input that is fixed in the short-run. Capital is often fixed because of its nature. Recall, that capital is itself the result of a production process. Further, as we just discussed, production takes time. As a result, increasing the amount of capital requires that the capital be produced, which takes time. For example, the construction of a new wing to a hospital is a change in the hospital's capital and takes time, perhaps as long as two or three years from initial planning to completion.

  Although capital is often the fixed input, other inputs may also be fixed in the short-run. For example, long-term labor contracts may fix employment for a firm. Unions often negotiate such long-term contracts. Another example of long-term labor contracts, which make the amount of labor the firm hires less variable, include university faculty. University faculty are often granted "tenure", which grants them a guarantee of employment in the future.

  How long is the short-run? Students should understand that the answer to this question varies according to the firm circumstances, which includes the type of industry. In our example above, the short-run is the two or three years it takes the hospital to build a new wing. However, for other firms in other industries the short-run may be shorter or longer, depending wholly upon the circumstances the firms face.

- The Long-Run in Production

  The long-run is a period of time during which all inputs can be changed, but technology cannot be changed.

  Although we have defined what we mean by improvements in technology previously, we have not talked about how technology changes. Basically, technology is produced. That is, advances in technology come about because firms devote resources to their production. This production normally takes longer than merely changing the firm's resources, even their fixed resources.

- The Very Long-Run in Production

  The very long-run is a period of time during which all inputs and technology can be changed.

C. The Economic Costs of Production

How much does production cost? This question is, of course, crucial to a profit-maximizing firm. As economists, our main goal is to make sure that we include all relevant costs in our measure of total costs of production. In general, a firm must pay money in order to produce because they must buy resources. Thus, the cost of these resources equals the costs of production. However, total costs include two types of costs:

- Explicit Costs

  Explicit costs are the easiest to understand; they simply consist of direct monetary payments from the firm to the owners of resources they buy and use in their production process.

- Implicit Costs

  Firms sometimes use resources in their production that they do not pay for directly. For example, the owner of a firm may not pay him or herself a direct wage. However, these resources remain valuable and relevant to the actual total costs of production. Hence, the cost of these resources must be included in our calculation of total costs.

  How can the cost of these resources be calculated? This is not a trivial question given that no direct monetary payment is made for the resources. The method we will use is to calculate their value by asking what they would have been worth in their next-best use. Imputing the cost of the resources used in the production process but not paid for directly by their value in the next-best use is, of course, simply the concept of opportunity cost.

  For example, if labor is being used in production but not paid for directly then the worker's lost wages would equal the opportunity cost of that labor. Similarly, lost interest, lost rent, and lost profit would be the opportunity costs for capital, natural resources and entrepreneurship.

- Total Costs

  Total Costs of Production simply equal the sum of explicit costs and implicit costs.

D. Profit

We can now define profit, which is of course crucial in our understanding of how profit-maximizing firms behave. We will define three different types of profit:

- Economic Profit

  Profit has two components, revenue and costs. Economic profits takes into account all of costs, both explicit and implicit. Hence, economic profit equals **total revenue minus total costs, which include both explicit and implicit costs**. In general, this is the type of profit that we will use in the remainder of this course.

- Accounting Profit

  Although profit does conceptually include both explicit and implicit costs, it is much more difficult to measure implicit costs. Economists tend not to worry about how to measure these opportunity costs, because we don't have to do so. Rather, we use the concept in order to build a theory about firm behavior. Neither developing nor understanding our theory of firm behavior actually requires us to measure profit or any of its components.

  Accountants, on the other hand, are interested in actually measuring variables, such as profit. In fact, measuring – counting – variables is the main job of accountants. As a result, accounting profits include only those components of economic profits that are easily measured and equal **total revenue minus explicit costs.**

- Normal Profit

  The concept of a normal profit illustrates the fact that accountants understand that implicit costs exist and affect firm behavior. Normal profit is an accounting concept that equals the amount of accounting profit a firm would normally need to make in a given industry to just stay in business.

  How much accounting profit would a firm need to just stay in business? To answer that question, simply apply the same question to economic profit. If economic profit is greater than zero, then the firm will clearly stay in business. They are not only covering all of the explicit costs but all of their implicit costs and even more. Thus, there is nowhere else the firm could do with its resources and make more money (why is that?).

  What would the firm do if economic profit were negative? Clearly, while the firm might be able to sustain such losses in the short-run, eventually the firm would go out of business. The only other possible level of economic profits not already considered is a level of zero profits. Would the firm stay in business with zero economic profits? Clearly, they are making enough in revenue to cover all of their costs, both explicit and implicit. If they shut down, they wouldn't lose anything but neither are they losing anything by producing. As a result, the firm is indifferent to producing or shutting down.

  The important point, though, is that the firm could choose to produce in the long-run with zero profits. Hence, we can see that the answer to our question; economic profits must be at least zero to just allow the firm to keep producing. Next, we must understand how much are accounting profits when economic profits are zero. The following example illustrates this point.

  Suppose total revenue equals $100,000 while explicit costs equal $60,000 and implicit costs equal $40,000. Clearly economic profits equal zero ($100,000 - $60,000 - $40,000) while accounting profits equal $40,000 ($100,000 - $60,000). But the $40,000 in accounting profits exactly equals implicit costs, and not by happenstance. In every single instance where economic profit is equal to zero, accounting profits must equal implicit costs.

  Hence, we have two definitions for normal profit. First, the one given originally above, the amount of accounting profit that a firm in a given industry would normally need to just stay in business. Second, normal profit equals implicit costs. That is, implicit costs equal the level of accounting profit that a firm

normally needs to just stay in business. As we can see, accountants are actually quite astute. Not only do they understand that implicit costs are real costs, impacting firm decisions and behavior, but they have developed a method to estimate those implicit costs.