

# Economies of scale definition



essay: Economies of Scale Definitionessay, Economies of scale, also called increasing returns to scale, is a term used by economists to refer to the situation in which the cost of producing an additional unit of output (i. e., the marginal cost) of a product (i. e., a good or service) decreases as the volume of output (i. e., the scale of production) increases.

It could also be defined as the situation in which an equal percentage increase in all inputs results in a greater percentage increase in output<sup>1</sup>. It is important to understand the concept of economies of scale because they can be an important factor in determining the optimal and equilibrium size of firms<sup>2</sup> and thus the structure of industries and their prices and output levels. Thus, they can have major implications for public policy, particularly where they lead to the development of natural monopolies, or where monopolies that are not natural monopolies claim that they are in order to try to prevent government attempts to break them up. Extent of Economies of ScaleThe extent to which economies of scale exist varies greatly according to the industry (i.

e., the type of product produced). In some industries they might be insignificant, and thus such industries would likely be characterized by numerous small firms competing with each other.

At the other extreme, there are industries for which economies of scale exist for the entire level of output that the market could absorb. This means that the marginal cost, and thus the average cost, of output would be lower if there were a single firm in the industry than if there were multiple firms. This type of industry is referred to as a natural monopoly. A monopoly is the

situation in which there is only a single supplier of a product in a particular market. Natural monopolies tend to arise when there are large economies of scale because the biggest producer can undercut the prices of the others and drive them out business and/or because the costs of entering the industry are so great that newcomers are effectively prohibited. Utilities such as pipelines, electrical distribution systems and railroads are typically natural monopolies in the areas that they serve. For most industries, economies of scale usually do not necessarily exist over the entire possible range of outputs.

Rather, they occur only to a certain level of output, or business size, and then diseconomies of scale, or decreasing returns to scale can set in, resulting in a U-shaped cost curve (i. e., on a graph of average cost per unit of output plotted as a function of the volume of output).

The simple model of perfect competition (i. e., an industry in which there are numerous buyers and sellers of a virtually identical product) makes the assumption of constant returns to scale (i. e.

, that the cost of production remains constant regardless of the volume of output). This model can be very useful, both for teaching economics and for explaining certain real-world situations. However, it should always be kept in mind that there are many situations in which it does not apply. Fixed Costs and Economies of Scale  
Marginal cost can decrease as the volume of output increases for several reasons. One is that larger production volumes allow fixed costs to be spread over more units of output.

Fixed costs are costs that do not change regardless of the amount of use, or at least change relatively little as a function of use. That is, they are costs that must be incurred even if production were to drop to zero. Examples of fixed costs could include factories, warehouses, machinery, electrical transmission systems and railways. Others would include a tunnel (for which there would be no change in cost regardless of the amount of rail or road traffic going through it) and an electrical transmission system (which would presumably have certain maintenance costs regardless of the amount of power flowing through it). Of course, there are current costs associated with these assets, and some of them will likely vary, at least in part, according to the level of output, such as maintenance and security.

However, these costs often tend to be relatively small relative to the costs of the main production assets themselves. Variable costs, in contrast to fixed costs, change directly as a function of use. Examples of variable costs are iron, coal, coal and labor and for producing steel, electricity or diesel fuel for hauling trains and skilled labor (e. g.

, programmers) for creating computer software. Large economies of scale are most likely to be found in industries characterized by large fixed costs. Large fixed costs, and hence large economies of scale, are prevalent in highly capital intensive industries such as railroads, steelmaking, petroleum refining, aircraft manufacturing and semiconductor production. That is, very large levels of production are required to bring unit costs down to the lowest possible levels. To attain such levels of output, it is necessary to have massive investment in production facilities, measured in the billions of dollars. Semiconductor production is not a natural monopoly.

That is, the economies of scale are not so great that the average cost could be minimized by just having one worldwide producer instead of multiple producers. This is because after a certain level of output that is far less than total worldwide demand, the average cost at each plant starts rising again.

Whether the production of large-sized aircraft is a natural monopoly is a more difficult question. At present, there are only two major producers worldwide, and without large subsidies and other protectionist measures by governments there might only be one. Other Causes of Decreasing

Costs There are other reasons that the cost of producing an additional unit of output can decrease as the volume of output increases.

One is that a larger firm also might be able to organize production more efficiently than a smaller one. This could be the result of something inherent in the production process that causes it. For example, steelmaking is more efficient with larger blast furnaces for various technical reasons, including better retention of heat. Likewise, certain chemical production processes are more efficient on larger scales. Another reason might be that a certain volume of output is necessary to be able to afford a certain number and quality of management and technology specialists that are needed to attain a lower cost of production. The marginal cost may also decline for larger volumes of output because larger volumes of output enable a firm to obtain its inputs at lower prices. For example, a larger producer is often able to obtain reduced prices from suppliers for its inputs, in part because the unit costs to the suppliers are lower for larger volumes (in some cases due to economies of scale that the suppliers themselves experience). Also, commodity freight rates usually decline as the volume of cargo tonnage

shipped increases, and this can apply to either or both inputs and the final product.

Moreover, a larger firm might be able to obtain financing at lower interest rates than a smaller firm, also contributing to its lower costs. In addition, larger firms tend to have more monopsony power with regard to inputs, including labor. A monopsony is the situation in which a single company is the sole purchaser of one or more products (just as a monopoly is the sole seller of a product).

Even some limited extent of monopsony power (e. g., being the largest user of a product or the largest company in a region) can give a company substantial bargaining power to reduce the cost of its inputs. To the extent that these reductions in the cost of inputs reflect reductions in cost to suppliers, they can be considered part of economies of scale. However, those reductions in cost that merely reflect enhanced bargaining power due to larger size (e. g., monopsony power) are not part of economies of scale.

**Networks, Scope, Agglomeration and Scalability** There are several other phenomena that resemble economies of scale, at least superficially, and that can also be important considerations in determining optimal public policy, particularly with regard to monopolies. Network effects cause the value of a product to individual customers to increase as more people own or use the product. They could be considered the demand side counterpart of economies of scale, which occur on the supply side (i. e., through larger volumes of output). However, they are not considered economies of scale because they are not actually the same thing as the volume of output or

efficiency within a single company. Examples of products or services for which network effects are important include transportation networks (e.

g., urban transport systems such as trams and subways) and communications services (e. g.

, telephones, faxes and e-mail). For example, the more people who have e-mail, the greater will be its usefulness to each user, because each user will be able to communicate with more people. Likewise, the more people who use a transportation system, the greater is the tendency for its management to provide an increased frequency of service and more routes, and thus the more useful it is to each user. Economies of scope are efficiencies associated with increasing the scope (i. e.

, the extent of) of marketing and distribution. They are conceptually similar to economies of scale, but whereas economies of scale apply to efficiencies associated with increasing the scale of production, economies of scope refer to increases in the number of different products. Economies of scale refer primarily to supply-side changes (such as level of production), but economies of scope refer to demand-side changes (such as marketing and distribution).

Economies of scope are one of the main reasons for such marketing strategies such as using a single brand name for group of products. For example, a sales force selling several different products can often do so more efficiently than if they are selling only one product. The cost of their travel time and other expenditures is distributed over a greater revenue base, thus cost efficiency improves with more products. There can also be synergies between products such that offering a complete range of products

gives the consumer a more desirable product offering than a single product would. The term economies of agglomeration is used to describe the benefits that firms obtain when locating near each other.

It is related to the idea of economies of scale and network effects in that the more related firms that are clustered together, the lower the cost of production. This is because firms have competing multiple suppliers, greater specialization of labor and greater ease of learning from other firms. Even when multiple firms in the same sector (competitors) cluster, there may be advantages because that cluster attracts more suppliers and customers than a single firm could alone<sup>3</sup>. The terms scalable and scalability are frequently used with regard to computer hardware, software and networks. These terms differ from economies of scale in that they refer to the ability to increase the number of users or the size of a system (e. g., the Internet) by adding additional hardware and/or software and without having to replace existing hardware and/or software and without incurring any large increase in average costs. Whereas economies of scale refers to a declining unit cost of output as a function of the volume of output, scalable refers to a unit cost of capacity (i.

e., hardware and/or software) that is relatively constant or declines as the amount of such capacity increases. <sup>1</sup>However, this definition might create conceptual problems, as it could be argued that there must be some extra increase in inputs but that it is just difficult to detect or visualize.

<sup>2</sup>Equilibrium sizes are common in nature, although the physical and chemical forces that govern them are not always obvious. For example, crystals for any type of mineral are usually within a certain range of sizes,

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and mature trees of any species likewise have a size range. Similarly, the great bulk of the human adult population falls within a certain range of heights for largely obvious reasons.

For example, being extremely tall can lead to circulatory and joint problems, and such people tend to have relatively short lifespans. Just as economies of scale usually occur for only a certain range of output (except in the case of natural monopolies), economies of agglomeration can also be limited to certain ranges. For example, it is possible for so many firms to be located close together that it results in severe negative effects, such as increased traffic congestion and exhaustion of local resources (e. g., labor and water), whose costs exceed the benefits of geographical proximity.