WHICH IS LONGER, THE SHORT RUN OR THE LONG RUN?

William L. Holahan, University of Wisconsin-Milwaukee
Mark C. Schug, University of Wisconsin-Milwaukee

ABSTRACT

This paper focuses on a common oversimplification in the presentation of one of the most basic concepts that we teach: the distinction between short run and long run in the theory of production. This paper illustrates how the terms "long run" and "short run" do not mean the same thing in demand and supply analysis they mean in the theory of production. In supply and demand analysis, short run and long run refer to the length of periods of chronological time. In the theory of production, the short run and long run refer to how time is used, not how much time is used. The long run refers to the planning process while the short run refers to operations. A survey of commonly available principles of economics textbooks reveals that this conceptual difference is not being taught.

Albert Einstein instructed us to explain the complex as simply as possible, but no simpler. Oversimplification will at the very least rob a subject of richness, and at worst mislead. Economics is based upon simplifying assumptions, and part of the science is the avoidance of misleading oversimplification. The purpose of this paper is to point out a common oversimplification in the principles of economics course, involving one of the most basic concepts that we teach: the distinction between short run and long run in the theory of the firm. The common definitions of these terms are so well accepted that a survey of available texts shows uniformity in the use of the overly simple definition. We then offer a simple way to resolve the issue with an explanation that clears up the potential for confusion, is economically correct, and is intellectually fun.

HOW THE "LONG RUN" AND "SHORT RUN" DIFFERS IN SUPPLY AND DEMAND VERSUS THE THEORY OF PRODUCTION

The basic problem is that the terms "long run" and "short run" do not mean the same in demand and supply analysis as they mean in the theory of the firm.

Unfortunately, none of the textbooks book we examined points this out. In supply and demand analysis, short run and long run refer to the length of periods of chronological time. In the theory of the firm, the short run and long run refer to how time is used as a resource, not how much time is used. In the long run firms plan; in the short run they operate the facility that they decided to install during their planning.

Our examination of widely available principles texts (see Table 1) reveals that in supply and demand analysis, authors correctly explain that demand is more elastic in the long run than in the short run because decision makers have more time to adjust to changes in prices. Similarly on the supply side, supply is more elastic in the long run than in the short run, again, because decision makers have more time to adjust. So, we give the students the clear and correct instruction that we are referring to the length of periods of chronological time.

Without proper explanation, students naturally think that the terms "long run" and "short run" in the theory of the firm are once again referring to chronological time as was the case in supply and demand analysis. In fact, many texts appear to reinforce misunderstanding when they explain that the short run is a period so short that only the variable factors of production can be varied as is the case in the standard Q = F (K,L) total product function, when only L can be varied in the short run. The implication is that K cannot be varied because there isn't enough time.

A FIRM CAN BE SIMULTANEOUSLY IN THE LONG RUN AND THE SHORT RUN

Two Ironies Flow from this Discussion

First, the long run can occupy a much shorter period of chronological time than the short run. An example that is both familiar and instructive is McDonalds. All students have been in a McDonalds restaurant, many of them hundreds of times. They can see the capital and the labor in a short run setting. They cannot see the long run planning, but that can be described: To establish a new McDonald's franchise, the franchisee works with planners from corporate headquarters to estimate demand, and, in turn, the size, shape and equipment that will maximize profits for the firm. The planning stage is the long run. Prior to installation, no hamburgers are being flipped when people are planning. Only when the best assortment of capital is chosen and installed can labor be applied to its operation.

Table 1 Short Run and Long Run Analysis

Author	Publisher and Year	The concepts of long and/or short run are explained properly with reference to chronological time in the supply and demand analysis	The concepts of long and/or short run are explicitly explained as not necessarily involving chronological time in the analysis of the theory of the firm	Explicit vocabulary of long range planning and short range operations is used
Karl E. Case & Ray C. Fair	Prentice Hall, 1996	Yes	No	No
David C. Colander	Irwin McGraw Hill, 2001	Yes	No	No
David N. Hyman	Irwin, 1997	Yes	No	Yes
N. Gregory Mankiw	Dryden, 1999	Yes	No	No
Campbell R. McConnell & Stanley L. Brue	McGraw Hill, 1999	Yes	No	No
Paul A. Samuelson & William D. Nordhaus	Irwin McGraw Hill, 1998	Yes	No	No
Bradley R. Schiller	Irwin McGraw Hill, 1997	Yes	No	No
Stephen L. Slavin	Irwin McGraw Hill, 1999	Yes	No	No
Joseph Stiglitz	Norton, 1997	Yes	No	No
Irvin B. Tucker	South-Western, 2000	Yes	No	No

The operation of the installed capacity takes place in the short run. A typical McDonalds can be planned, built, and ready for operation in a matter of a few months, and operated for many years. That is, the short run operating period is a much longer period of chronological time than the long run planning period. In fact, the better the long run planning decisions, the longer the short run will last.

Second, a firm can be in the long run and the short run at the same point in time. How can this be? Firms typically have operating divisions and planning divisions working at the same time. Operating divisions work in the short run as they produce goods and services. At the same time, across the hall or across the world, others in the firm are working in the long run. These are the planners who are deciding what changes are to be made to capital and how labor is to be deployed in the future. Not only can the long run and the short run take place at the same time, the long run can precede or succeed the short run. For example, the long run must precede the short run in the installation of a new McDonalds, then after the short run has expired and the restaurant goes out of the fast food business, the planners must return to determine how the land and building will be used in future, a long run exercise that may not take much chronological time.

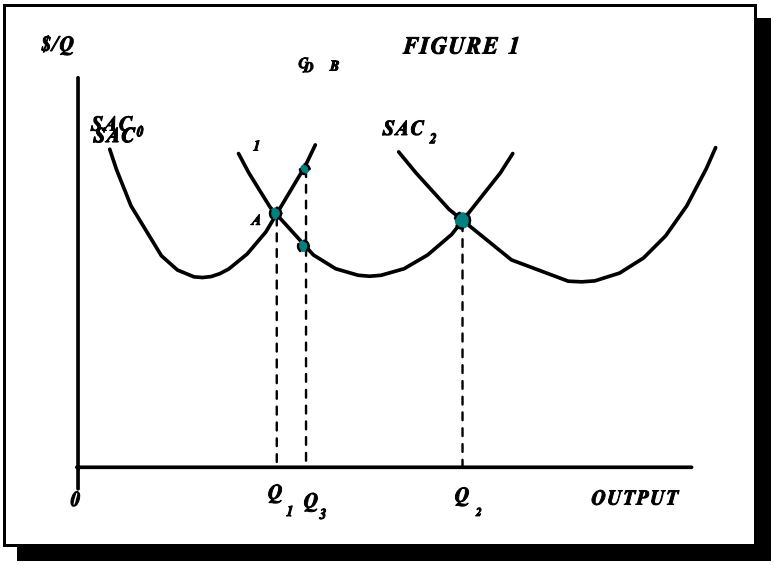
In the planning mode of the firm, all factors of production are variable and, because of the nature of the long run, not much chronological time may be involved. In the long run, planners are considering different combinations of capital and labor by examining blueprints and computer-aided design programs. For example, an architect can now use computer programs to draw up plans for a building, and not only have computer generated pictures of the building exterior and interior, but actually move virtual walls right on the screen and simultaneously have a spreadsheet re-calculate costs. Thus the planner can see several of the long-run alternatives before committing to the best short run choice.

LONG RUN AND SHORT RUN AVERAGE COST CURVES

There is no need to alter the traditional diagram that shows the geometric relationship between the long run average cost curves and the short run average cost curves. But the proper definition of long run and short run is essential to understanding what these curves actually display. It is more a matter of enriching the interpretation of the graphs to include the fact that real firms can be both planning and operating at the same time. Moreover, firms may be planning without operating, or operating without further planning. The long run average cost curve

shows only the envelope of the short run curves, and cannot therefore include the costs of planning and adjusting capital.

Figure 1 displays the standard depiction in which three SAC curves are drawn. For a firm that has three scales of plant from which to choose, SAC0 and SAC1 intersect at point A, and SAC1 and SAC2 intersect at point B. Therefore, if the firm is planning on an output range between zero and Q1, the planner will install the scale of plant associated with SAC0. Similarly if the output range is expected to be between Q1 and Q2, the planner will install SAC1; and for an output range above Q2, SAC2.



But what if things change and the original output expectation is not what actually happens? Suppose that SAC0 is selected and installed but output averages Q3 rather than the expected zero to Q1 range. Then average costs will be at the height of point C, whereas the same output could be produced at lower cost at the larger scale of plant shown by SAC1 at point D. The planner in the firm now has to evaluate whether the reduction in cost that will be available at the larger scale of plant outweighs the cost of making the additional capital investment. The cost of making the investment is sunk once capital is installed, and the only costs that are reflected in the cost curves are the opportunity costs of capital and labor in the short run.

This new way of looking at the short run and long run distinction is not inconsistent with the treatment in the standard texts, but rather enriches it. For example, the short run is a period in which some factors, usually called capital, are fixed. But they are not fixed because the short run is a short period of chronological time, as the texts state. Rather the fixed factors are fixed either because the cost-minimizing scale of the plant has been chosen or because the cost of adjusting capital from one scale of plant to another is greater than the present value of expected savings to be derived from changing to the cost-minimizing scale of plant. The better the choices made in the long-run planning phase, the smaller will be the incentives to change the scale of the plant. Therefore, the short run may last a long period of chronological time, much longer than the long run.

This distinction works outside the theory of the firm as well. Consider marriage. Many of your college students are unmarried people seeking spouses. Spouse-seeking unmarried people are selecting potential mates from alternatives found on campus and elsewhere. This process of sorting is long run planning. But, marriage changes everything because it requires a choice of a scale of plant. The married state is actually the short run since once married, people find it financially and emotionally expensive to change their spouse, i.e., their fixed factor of production. Married spouses who engage in long run activity are bound to shorten the marriage's short run. In marriage, it is fine to be in it for the long haul, but not the long run.

SUMMARY

The purpose of this paper is to caution teachers of the principles of economics course that the terms "long run" and "short run" do not mean the same thing in demand and supply analysis as they mean in the theory of production. In supply and demand analysis, short run and long run refer to the length of periods of chronological time. In the theory of the firm, the short run and long run refer to how time is used, not how much time is used: the long run refers to the planning process while the short run refers to operations.

REFERENCES

Case, K. E. & Fair, R. C. (1996). *Principles of economics*. (4th Ed.) Upper Saddle River, NJ: Prentice Hall Inc. .

Colander, D. C. (2001). *Economics*. (4th Ed.) Boston, MA: Irwin McGraw-Hill.

Hyman, D. N. (1997). *Economics*. (4th Ed.) Boston, MA: Irwin McGraw-Hill.

Mankiw, N. G. (1998). *Principles of economics.* Fort Worth, TX: The Dryden Press.

Nordhaus, S. (1998). *Economics*. (16th Ed.) Boston, MA: Irwin McGraw-Hill.

Schiller, B. R. (1997). *The economy today*. (7th Ed.) Boston, MA: Irwin McGraw-Hill.

Slavin, S. L. (1999). *Economics*. (5th Ed.) Boston, MA: Irwin McGraw-Hill.

Stiglitz, J. E. (1997). *Economics.* (2nd Ed.) New York, NY: W. W. Norton & Company, Inc.

Tucker, I. B. (2000). *Economics for today.* (2nd Ed.) Cincinnati, OH: South Western College Publishing.

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