

Durable and Storable Factors

Course note to accompany Lecture 4 of Elements of Economics II

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This is the first of several notes for this course; when I have not been able to find a suitable treatment of a topic in an intermediate textbook, I have written a note up myself.

The standard analysis of the short- and long-runs of cost and supply relies on an important assumption that holds true in many, but not all, markets. I will emphasize, in class and a bit throughout the course, the importance of whether this assumption hold or fails. The key distinction is between whether different inputs to the production process are *inter-temporal complements* or *inter-temporal substitutes*. For brevity I will refer to these respectively as *durables* and *storables*. This matches with the use of these terms in some, but not all, parts of economics, so be aware of the difference between how I use these and how you may see them used other places.

Durable factors last for a fixed (but extended) period of time and therefore it is impossible, or at least cost-ineffective, to change one's use of them frequently. Time since purchase determines how depreciated (reduced in value) durables are, more than does how many times they have been used. Classic examples of durable factors are education, entry of a firm into a market, investment in fixed equipment and plant and employment relationships with highly skilled and trained workers. Because durable goods last a fixed period of time and offer many opportunities during the period of their life for being used, they make *scarce* the period during which they may be used but *abundant* the opportunities for use during that period. The level of use of durables is thus relatively easy to adjust if one has a long period over which the adjustment can be made and sustained, but is costly to adjust for a short period. Industries requiring durable factors are therefore much more responsive to sustained demand shifts than short-lived demand shifts, as indicated by the classic short-run/long-run analysis.

There are also durables individual consumption decisions and to make the analysis more vivid, let us consider an example. Demand for housing is durable. Individuals find it difficult to live in one place today and another tomorrow. Their consumption of housing is thus complementary across time. Few people, therefore, would live in one place today, another place tomorrow and then move

back to where they moved from. A permanent shift in house prices in a city is much more likely to affect the demand for living there than is a transitory shift.

Storable factors exhibit opposite properties: they may be kept for an extended period of time, but each time they are used they are lost forever. How many times they have been used, much more than how long since they have been created, determines the depreciation of storables. Classic examples of storable factors are oil (from the perspective of the world economy as a whole), money (from the perspective of an individual), favors owed, goods in a factory's inventory and soldiers in a long or a dangerous war. Because storable goods last for very long periods of time but may only be used a small number of times, they make *scarce* opportunities for their use but *abundant* the period during which they can be used. The level of storables used is thus easy to adjust for a short period of time (by reducing their use a bit in the future), but is costly or impossible to adjust for a sustained period. Industries with storable inputs, such as the oil industry, are therefore much more responsive to transitory demand shifts than to ones expected to persist, in direct contradiction of the standard short-run/long-run analysis.

Again taking a consumer, rather than producer, example, demand for vacations is typically storable. Individuals would become bored if they were constantly on vacation and can delay ("store") their demand for vacations up over a long period of time. However, most individuals would be highly resistant to taking a job that never offered the opportunity for a vacation. This is why individuals are usually happy to schedule vacations around their work, but strongly prefer work that offers an opportunity for vacations at some point.

Thus the classical analysis of the short- and long-run presented in Varian (and derived originally from Alfred Marshall) tells only one side of the story. While it is certainly right that supply is more elastic over time periods when it is easier to adjust more factors (called *Le Chatelier's Principle*), *it is wrong to suppose it is always easier to adjust more factors over longer periods*. As long as one keeps this in mind, the analysis is highly useful; one just has to be aware of the fact that when thinking about a market where storable inputs are more important than durable inputs, one should reverse the words "short" and "long".

For our purposes, durability and storability are *relative to the markets for the goods*. If a firm can rent a machine for a week at no greater cost per-week than owning it during its whole life time, the machine is not really durable for the firm as its services can be consumed on a momentary basis. If a firm can freely purchase new units for its inventory at a nearly-fixed price, the goods are not really storable even if it would be feasible to store them. What makes a factor durable or storable, then, is that the factor has *a specific, committed value to that firm that cannot be recovered in the marketplace at low cost* that has a fixed duration and may be used freely during that duration or a fixed supply and may be used for an unlimited period of time, respectively. This is again a bit of a distinction to what you may see the terms used to mean in other contexts, so be aware of the difference.

It is often, though not always, easier for firms to transfer at a reasonable market rate of return their storable factors. An important reason is that money, the common denominator of markets, is the most storable of all factors. On the other hand it is often difficult for firms to purchase without loss their durable factors, as adaptation of these factors often must be made to the firm's specific needs in order for them to be valuable. It is this greater empirical frequency of durable factors compared to storable factors that justifies the emphasis of Varian and others on the classical short-run/long-run analysis, rather than any theoretical consideration. Keep an eye out for cases which violate this traditional perspective, as they are often the source of great confusion given the textbook dogma that short-run supply is less elastic than long-run supply.