Fallacy of Petty Incrementalism
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Fallacy of Petty Incrementalism.

This Fallacy bids us consider only minor nibbling at fringes of existing uses, overlooks major changes in uses, quantum leaps of all kinds. It can easily lead us to a low local max on the shoulder of a peak: a "molehill on a mountainside." It is one of the few errors by the estimable Alfred Marshall, whose motto was *Natura non facit saltum* (nature makes no leap). In fact, nature does leap (mutations, eruptions, extinctions, ice ages), and so do mankind, society, and the economy. It was, rather, Marshall who made no leaps - he was a cautious fellow.

We have seen that high-volume land uses (intensive, with high elasticity of production) compete for land with low-volume land uses (extensive, with low elasticity of production) where the low-volume uses yield high rents/worker. The high-volume uses are marginal in those areas (called "ecotones," where sharply different land uses compete for the same land), so a small drop in prices relative to variable costs wipes out their rents. Here, adjustments to price changes are not minor marginal changes, but quantum changes in use.

Again, in urban growth there often comes a need to replace a collection of individual systems with one large system, e.g. a mass of septic tanks with a sewer system, or a gaggle of private cars by mass transit. Just prior to the last, improving traffic control is rearranging deck chairs on the Titanic.

The Fallacy of Petty Incrementalism vastly understates supply responses to price and cost changes. A current petty incrementalist in California is a certain Prof. at UC Davis, who studies the economy of water use and declares that farmers cannot lower their water use by more than 2% without basic changes (which are presumed to be unthinkable). He will consider only incremental changes in operating current systems with current crops, overlooking possibilities of shifting from alfalfa, rice, and irrigated pasture (high water use, low value) to berries, vines, and orchards (low water use, high value); from primitive flood and furrow irrigation to drip irrigation; from bad lands to good lands; etc.

He overlooks the remarkable fact that you can often produce more value per acre, and employ more workers, with less water per acre. This is because water applied to land often substitutes for labor. The landowner, in such cases, measures the productiveness of water in lower costs per acre, rather than higher yields. The same is often true of energy.

Diminishing Returns

Diminishing returns: the basic model of a fixed and a variable factor, with increasing and then diminishing returns to the variable factor.

a. Traditional choice of land as the fixed factor. This intuitively corresponds with many real situations, and keeps our feet on the ground. Managers can also change the land input, but this can be introduced later. Land markets are sticky and highly imperfect, for a variety of reasons. This model was originally thought also to apply by analogy to the whole world, with its limits, and there remains an element of truth in that which is again widely recognized.

Another approach, not followed here, is to view everything in terms of marginal trade-offs along indifference or equal output or isoquant curves. This has certain values, one being that such trade-offs show what happens when output remains constant. But with limited time, we confine ourselves here to the traditional approach which retains a greater realism, and has never gone out of use.

b. Symmetry of the principles. We can let the variable input be fixed at any point in the model, and let the fixed input become the variable.

c. We assume constant returns to scale. The purpose is to simplify, and to abstract from scale while we focus on the effects of changing proportions.

Constant returns to scale means that an increase of x% in all inputs causes an x% increase of product. It follows that an x% increase in just one input causes a less than x% increase of product. The ratio of the second % to the first one is called "elasticity of production"; it is normally less than one.

d. An ultimate synthesis is possible combining analysis of proportions with analysis of scale. This is the long run curve of marginal net productivity, the last thing in these notes, which leads us to analyze economies of scale.

Not just agric.

e. Universal nature of diminishing returns. Theory transcends technology. Crowding on highways; thickness of insulation; height of buildings; trees/acre; water and fertilizer and pesticide/acre; overcrowded workers; isolated workers (diminishing returns to land); radio interference; stacked-up aircraft; overheating power lines and transformers; etc. ad inf.

The Marginal Product as a Systems Concept.

The increased product due to the last man added is not attached to that person individually. All units of any input are interchangeable, by assumption. It is not the individual as such, but the increase in quantity that causes added output. To make best use of the last input, the whole system must be adjusted, and that is what good managers do (bad ones may not). Thus, marginal adjustments are not marginal but systemwide.

The last individual produces the same AP as all the others. But he drags down the AP for all, and it is that decline that makes "his" MP lower than their AP. He does not drag it down because he is inferior, but because everyone is now more crowded.

Example of adding more trees/acre. MP of last tree is less than its own fruit yield by the decline in yield of all the other trees, which are now more crowded.

Example of adding 11th acre (here land is the variable). It draws its workers from the first 10, thus lowering their yields, so its MP is that much less than its apparent yield, i.e. the grain whose roots it holds physically.

Alternatively we could change the model to have more workers enter from outside. In this case we have to deduct their cost to get the net or "clean" marginal product imputable to the land (net means "clean" in French, and "produit net," originally applied to land, means "rent," and was central in the thinking of Dr. Francois Quesnay, one of the chief founders of economic science.) Deducting the money cost of these outside workers has the same effect as deducting the reduction from the first 10 acres caused by removing some of their workers, so that marginal net product, the second alternative, has the same value as the simpler marginal product, so long as the changes are small. Thus the marginal product of any input is net or "clean" of the contributions owed to other inputs, and measures its pure and sole contribution after deduction of associated costs. This makes it an extremely useful concept in practise.