

To simplify the interpretation of a production function, it is common to divide its range into 3 stages. In Stage 1 (from the origin to point B) the variable input is being used with increasing output per unit, the latter reaching a maximum at point B (since the average physical product is at its maximum at that point). Because the output per unit of the variable input is improving throughout stage 1, a price-taking firm will always operate beyond this stage.

In Stage 2, output increases at a decreasing rate, and the average and marginal physical product are declining. However, the average product of fixed inputs (not shown) is still rising, because output is rising while fixed input usage is constant. In this stage, the employment of additional variable inputs increases the output per unit of fixed input but decreases the output per unit of the variable input. The optimum input/output combination for the price-taking firm will be in stage 2, although a firm facing a downward-sloped demand curve might find it most profitable to operate in Stage 1. In Stage 3, too much variable input is being used relative to the available fixed inputs: variable inputs are over-utilized in the sense that their presence on the margin obstructs the production process rather than enhancing it. The output per unit of both the fixed and the variable input declines throughout this stage. At the boundary between stage 2 and stage 3, the highest possible output is being obtained from the fixed input.

