Output Supply under Competition

Claim: The supply curve of a perfectly competitive firm producing a single good is the portion of the firm’s marginal cost curve which lies above its average variable cost curve.

**Step 1:** Intuitive notion of supply: “All combinations of price and quantity at which a firm is willing and able to sell at a given time when everything except the price is held constant.”

**Step 2:** A firm is willing and able to produce a given amount of a good at a given price only if this decision is consistent with the overall objective of maximizing profits.

**Step 3:** Profits are maximized only if $MR = MC$.

**Step 4:** Since the firm is a price taker, $MR = P$ and the profit maximization rule becomes: $P = MC$. The set of points satisfying this condition is the marginal cost curve itself.

**Step 5:** If the price is so low that revenue is insufficient to cover variable costs, the firm should shut down temporarily and incur only fixed costs. The shutdown point occurs where $VC = TR$, or

$$AVC = \frac{VC}{Q} = \frac{TR}{Q} = \frac{PQ}{Q} = P.$$

Thus, the firm would shut down for points on the $MC$ curve below $AVC$. The remaining part of the $MC$ (i.e., the part above the $AVC$ curve) is the supply curve of the firm.

---

Labor Demand under Competition

Claim: The demand curve for labor of a firm that employs labor as the sole variable input and is a price taker in both the product and labor markets is the portion of the firm’s marginal revenue product curve which lies below its average revenue product curve.

**Step 1:** Intuitive notion of demand: “All combinations of price and quantity at which a person is willing and able to consume at a given time when everything except the price is held constant.” In this context of a labor employment decision this would be: “All combinations of wage rate and labor at which a firm is willing and able to hire at a given time when everything except the wage is held constant.”

**Step 2:** A firm is willing and able to hire a given number of workers at a given wage rate only if this decision is consistent with the overall objective of maximizing profits.

**Step 3:** Profits are maximized only if $MRP_L = MFC_L$; where $MRP_L = \frac{\Delta TR}{\Delta L} = MR \cdot MP_L$ and $MFC_L = \frac{\Delta TC}{\Delta L}$.

**Step 4:** Since the firm is a price taker in the product market, $MR = P$. Since the firm is a price taker in the labor market, $MFC_L = w$. The profit maximization rule becomes: $P \cdot MP_L = w$. The set of points satisfying this condition is the marginal revenue product curve itself.

**Step 5:** If the wage rate is so high that variable costs (i.e., $VC = wL$) exceed total revenue, the firm should shut down temporarily and incur only fixed costs. The shutdown point occurs where $VC = TR$, or $ARP_L = \frac{TR}{L} = w = MFC_L$.

Thus, the firm would shut down for points on the $MRP_L$ curve above the $ARP_L$ curve. The remaining part of the $MRP_L$ (i.e., the part below the $ARP_L$ curve) is the firm’s demand curve for labor.