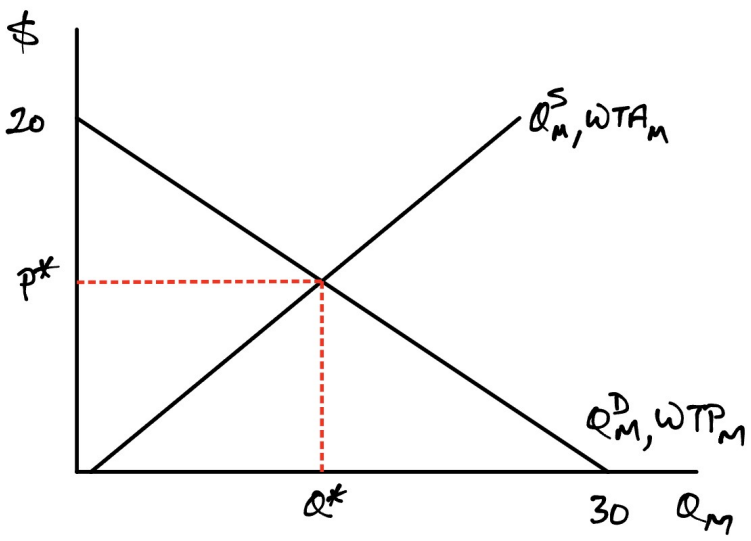
Finding the Equilibrium

Market demand and supply equations:

$$Q_M^D = 30 - \frac{3}{2}P$$

$$Q_M^S = \frac{3}{2}P$$

Graphing:



Finding P^* and Q^*:

Two possible approaches:

1. $Q_M^D(P^*) = Q_M^S(P^*)$ Demand equals supply
2. $WTP_M(Q^*) = WTA_M(Q^*)$ WTP equals WTA

Here, first is easiest since we have Q_M^D and Q_M^S.

Three equations and three unknowns:

$$Q_M^D = Q_M^S$$
$$Q_M^D = 30 - \frac{3}{2}P$$
$$Q_M^S = \frac{3}{2}P$$

Substituting and simplifying:

$$30 - \frac{3}{2}P = \frac{3}{2}P$$

$$30 = 3P$$

$$P = 10 \text{ (equilibrium price)}$$

Finding Q:

$$Q_M^D = 30 - \frac{3}{2}P = 30 - \frac{3}{2} * 10 = 15$$

Checking:

$$Q_M^S = \frac{3}{2} * P = \frac{3}{2} * 10 = 15 \text{ (same as } Q_M^D\text{, passes check)}$$

Equilibrium:

$$P^* = \$10, Q^* = 15$$