Market Power: Monopoly and Monopsony

Econ 50 | Lecture 17 | March 3, 2016

Monopoly

Price Taker

Monopsony


AT&T
90%
Chuck Norris
mobile
Answer
Answer
Chuck Norris
Can't be denied

PALO ALTO's
CALIFORNIA AVENUE
Farmers' Market
URBAN VILLAGE FARMERS' MARKET ASSOCIATION

Monopoly/Monopsony as Metaphor

- True “monopolies” are rare
- Firms with some (at least local) market power are common
- We’ll use “monopoly” and “monopsony” as a metaphor to analyze any firm that doesn’t simply take prices as given
- Goal for this class: get to a more general notion of profit maximization than the limited “perfect competition” model

Lecture

- General Profit Maximization
- Monopoly Profit Maximization
  - Marginal Revenue
  - Inverse Elasticity Pricing Rule (IEPR)
  - Lerner Index

Group Work

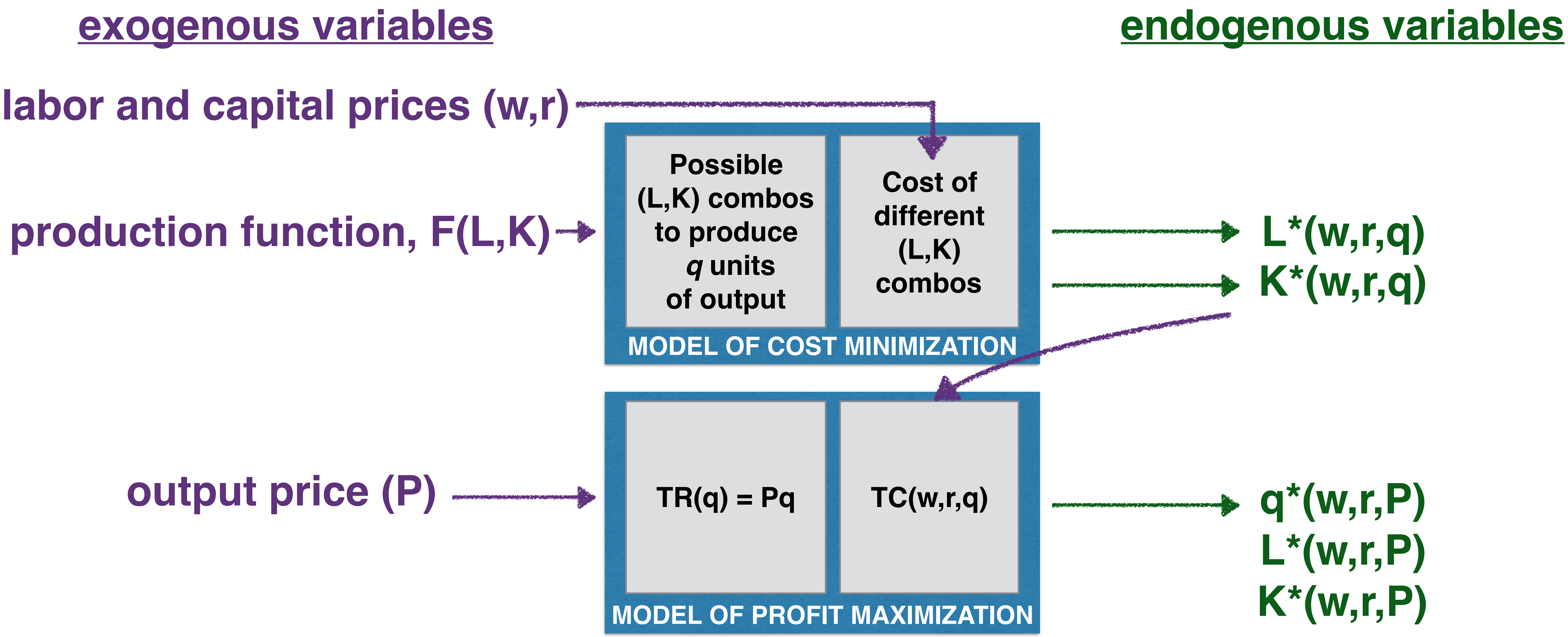
- Monopoly: simple example
- Deriving the profit-maximizing conditions for a monopsony

Part I

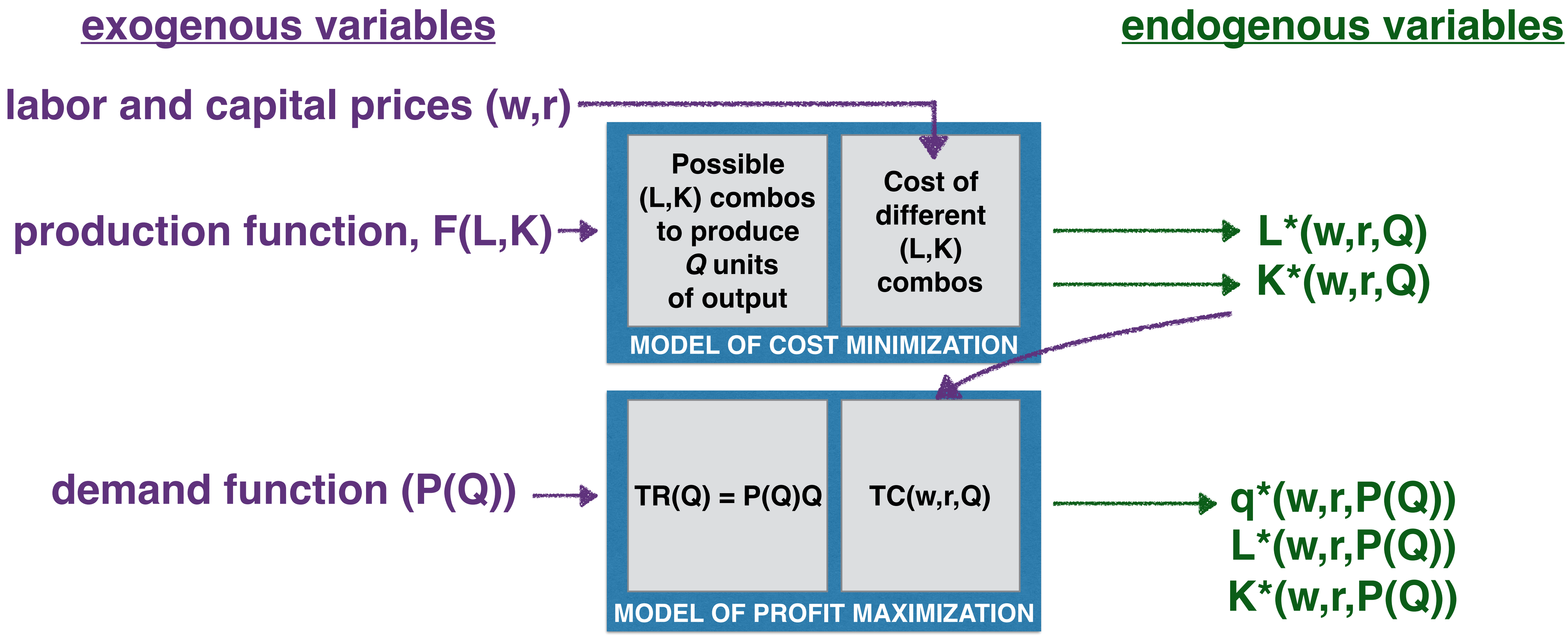
General Profit Maximization

God grant me
the Serenity
to accept the things
I cannot change
Courage to
change the things I can
and the Wisdom
to know the difference

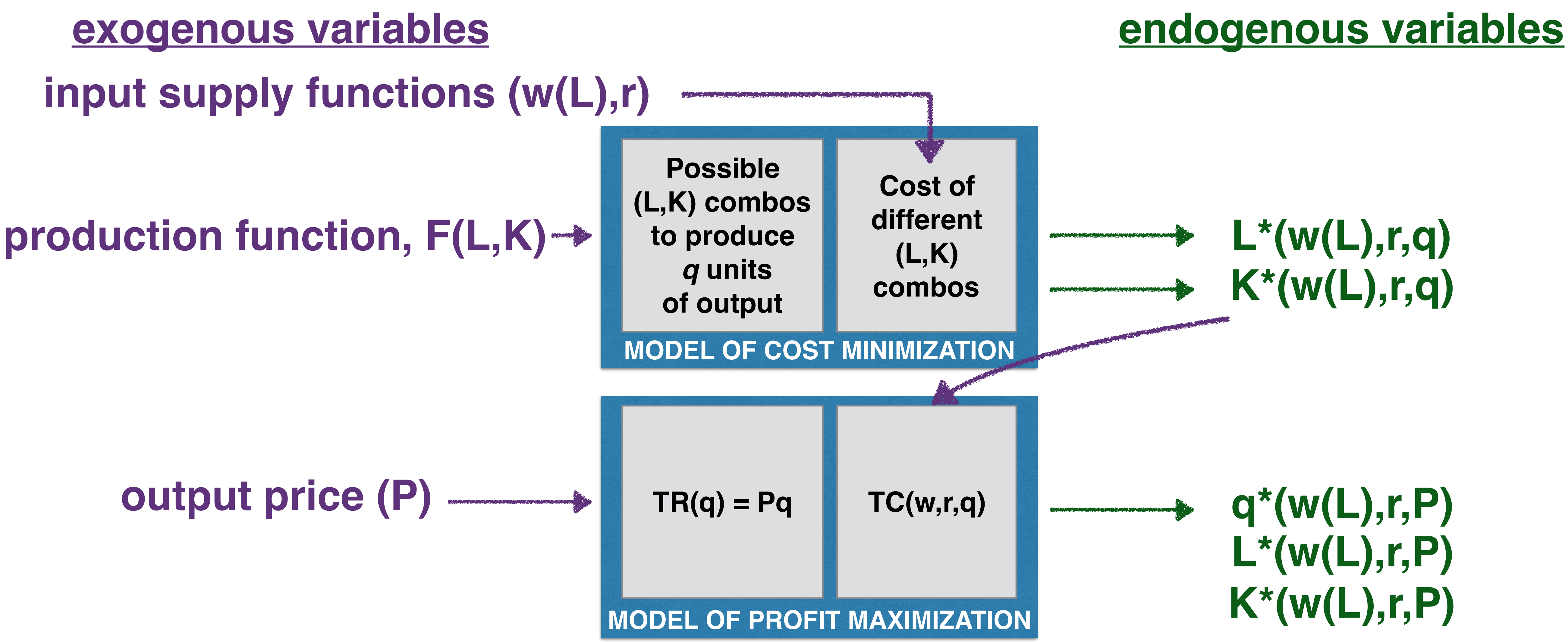
Perfect Competition:
Take **{w, r, P}** as Given



Monopoly:
Take **{w,r,P(Q)}** as Given



Monopsony in Labor Market:
Take **{w(L),r,P}** as Given



$$\pi(a, b) = TR(a, b) - TC(a, b)$$

a = “things you can change”

b = “things you can’t change”

PERFECT COMPETITION

$$\pi(a,b) = TR(a,b) - TC(a,b)$$

a = “things you can change”

b = “things you can’t change”

MONOPOLY

$$\pi(a,b) = TR(a,b) - TC(a,b)$$

a = “things you can change”

b = “things you can’t change”

MONOPSONY (IN LABOR MARKET)

$$\pi(a,b) = TR(a,b) - TC(a,b)$$

a = “things you can change”

b = “things you can’t change”

Summary

Perfect Competition	Monopoly	Monopsony
w	w	**w(L)**
r	r	r
P	**P(q)**	P

Profit Maximization

$$\pi(a,b) = TR(a,b) - TC(a,b)$$

$$\frac{\partial \pi(a,b)}{\partial a} = \frac{\partial TR(a,b)}{\partial a} - \frac{\partial TC(a,b)}{\partial a} = 0$$

for each choice variable *a*
(e.g., L and K, or just q)

Given a production function $q = f(L, K)$

input prices (w, r),

and the market price of output (P),

there are two ways of thinking about the firm's problem:

	Profit =	Total Revenue	– Total Costs
Choosing **inputs**:	$\pi(L, K) =$	$P \times f(L, K)$	$- (wL + rK)$
Choosing **output**:	$\pi(q) =$	$P \times q$	$- TC(q)$
		(Value of output)	(Cost of inputs)

Choosing Inputs

	Profit	=	Total Revenue	−	Total Costs
			(Value of output)		(Cost of inputs)
Total Profit:	$\pi(L, K)$	=	$P \times f(L, K)$	−	$(wL + rK)$
Marginal Profit (L):	$\frac{\partial \pi(L,K)}{\partial L}$	=	$P \times MP_L$	−	w
Marginal Profit (K):	$\frac{\partial \pi(L,K)}{\partial K}$	=	$P \times MP_K$	−	r

Marginal profit = 0 when $P \times MP_L = w$ and $P \times MP_K = r$

Choosing Output

	Profit =	Total Revenue	–	Total Costs
		(Value of output)		(Cost of inputs)
Total Profit:	$\pi(q)$ =	$P \times q$	–	$TC(q)$
Marginal Profit:	$\frac{d\pi(q)}{dq}$ =	P	–	$MC(q)$

Marginal profit = 0 when $P = MC(q)$

$$F(L, K) = 3L^{\frac{1}{3}}K^{\frac{1}{3}}$$

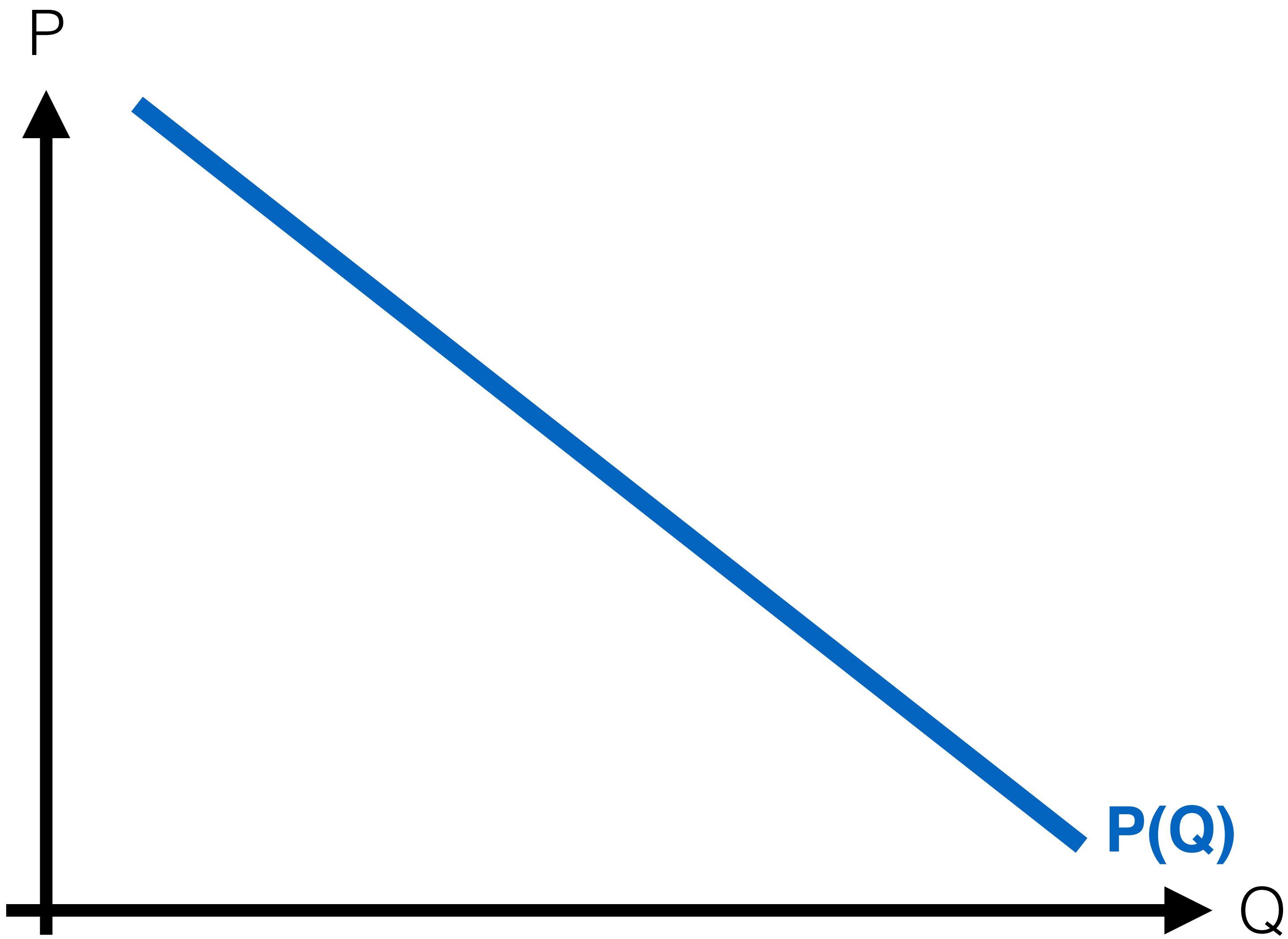
Solve SW's profit-maximization problem directly (i.e. in terms of L and K) to derive its short-run **profit-maximizing input demand functions**, its short-run **supply function**, and its short-run (maximized) **profit function**, $\Pi^{SR}(P, w, r, \overline{K})$. Confirm that Hotelling's Lemma holds in the short run.

Part II
Monopoly Profit Maximization

Marginal Revenue, in Words

- A monopoly faces a downward-sloping demand curve
- Constrain ourselves to thinking about a **single-price monopoly**: it sets a price P, and then consumers choose how much to buy Q(P)
- **Inverse Demand Curve: P(Q)**
  "If we want to sell Q units, what price P should we set?"
- Marginal Revenue: "If I'm selling Q units at P(Q), how much more revenue would I get by selling (Q+1) units at P(Q+1)?"

Marginal Revenue, Graphically

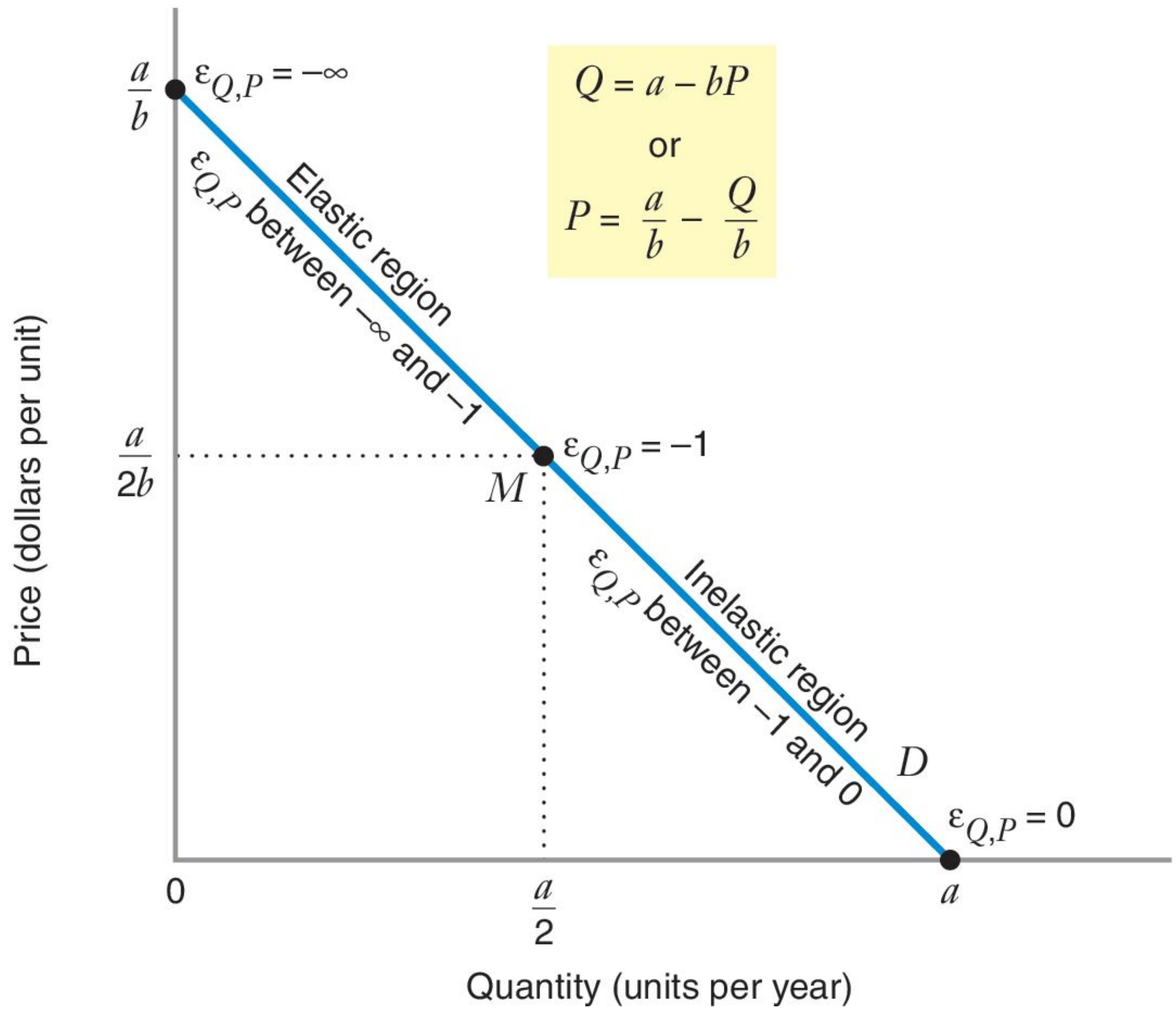


Marginal Revenue, Mathematically

Marginal Revenue, with Calculus

Marginal Revenue and Elasticity

Inverse Elasticity Pricing Rule



$Q = a - bP$
or
$P = \frac{a}{b} - \frac{Q}{b}$
$\frac{a}{b}$
$\varepsilon_{Q,P} = -\infty$
Elastic region
$\varepsilon_{Q,P}$ between $-\infty$ and -1
$\frac{a}{2b}$
$\varepsilon_{Q,P} = -1$
M
Inelastic region
$\varepsilon_{Q,P}$ between -1 and 0
D
$\varepsilon_{Q,P} = 0$
0
$\frac{a}{2}$
a
Price (dollars per unit)
Quantity (units per year)

Lerner Index

We don't observe demand elasticity directly;
but we can observe price markup above marginal cost!

Lerner Index: $\frac{P - MC}{P}$

0 for a perfectly competitive industry;
increases with market power

Group Work: Monopoly

- A monopolist with a marginal cost of **MC(Q) = Q** faces the inverse demand curve **P(Q) = 12 - Q**.
- Find the monopolist's marginal revenue, **MR(Q)**
- Set **MR(Q) = MC(Q)** and solve for **Q***.
- Draw a graph showing **P(Q)**, **MR(Q)**, **MC(Q)**, and **Q***.
- Calculate the **price elasticity of demand at Q***, and confirm the **IEPR**.

Group Work: Monopsony

- Write down the general profit maximization problem, in terms of L, for a monopsonist facing the inverse labor supply curve **w(L)**.

- The **marginal expenditure on labor, ME(L)** is like the marginal revenue **MR(Q)**: it's the change in total cost as a function of labor hired. Take the derivative of the firm's total expenditure to **find an expression for ME(L)**; intuitively describe its terms.

- Write ME(L) in terms of the wage elasticity of labor. Set this expression equal to MRP_L to **derive the inverse elasticity pricing rule for a monopsony**.

- Suppose the monopsonist's **MRP_L = 12 - L**, and it faces the labor supply curve **w(L) = L**. Find its profit-maximizing choice of labor, L*. Illustrate this profit maximization in a a graph showing its $MRP_{L,}$ $ME_{L,}$ w(L), and L*.