

EE211

PRINCIPLES OF MICROECONOMICS

Topic 9:

Factor Markets

Topics

- Demand for factor as a derived demand
- The firm's demand for a factor
- The supply of a factor
- Determination of factor prices

Introduction

- Recall that a firm's objective is to maximize its profit:

$$\pi = TR - TC = PQ - (wL + rK)$$

- We've talked about the output markets, and how the output price is determined in the previous lecture.
- This lecture will focus on the factor market, and how the factor price is determined.
- In this class, we only look at the competitive factor market in the short run under 2 scenarios:
 - ❖ Competitive output market
 - ❖ Monopoly output market

The Demand for Factors

- In previous topics, we talked about the demand for goods – this is the demand by consumers for their own consumption.
 - Producers also have a demand for the goods for their production. This producer's demand is a result of consumer's demand for goods, and is called “derived demand”.
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- **Derived demand** is the **demand for a factor of production** that results from the demand for the products that it is used to make.
 - E.g. Demand for wood by carpenters

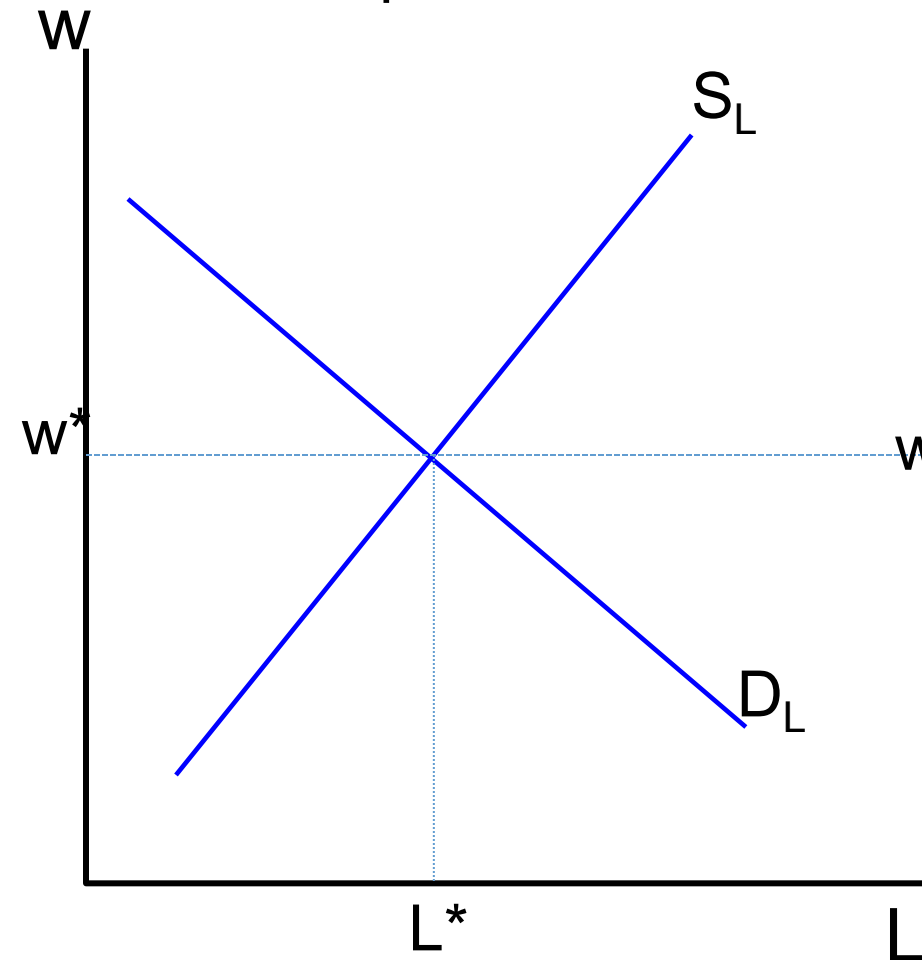
COMPETITIVE FACTOR MARKET & COMPETITIVE OUTPUT MARKET

Assumptions

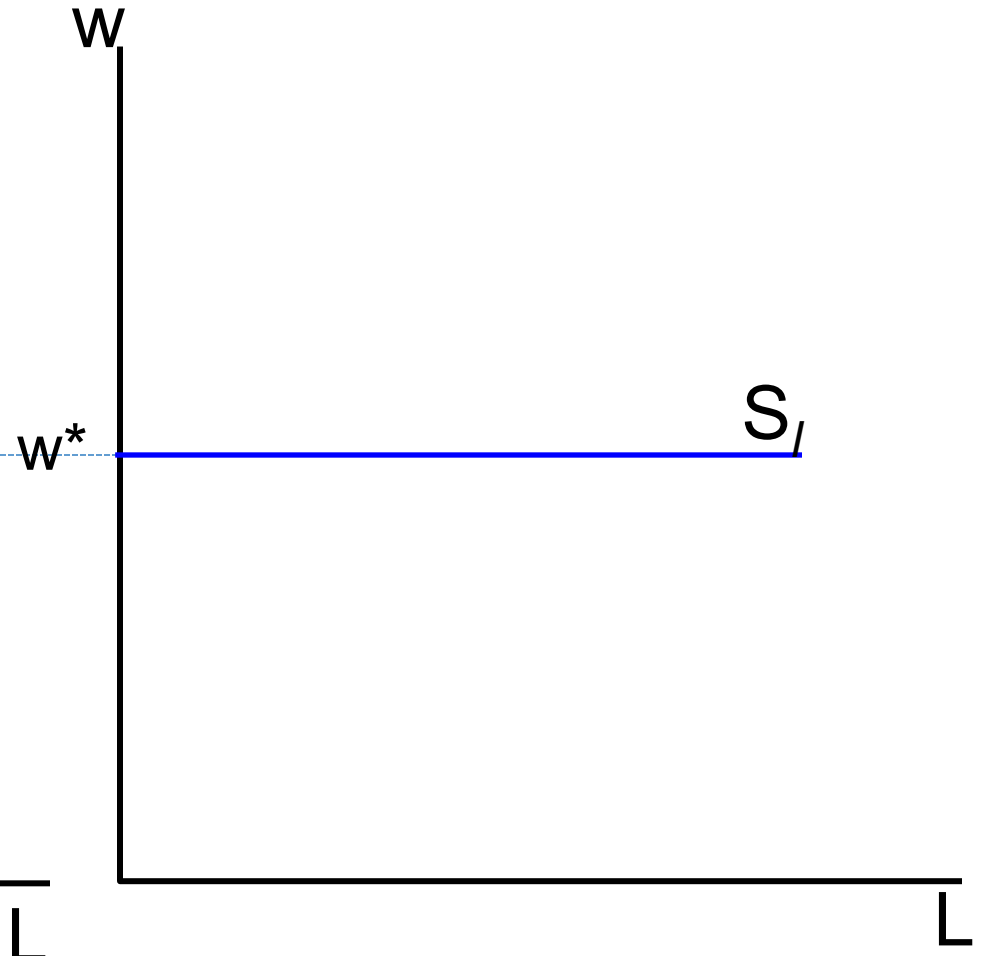
- There are many buyers and sellers in both factor market and output market.
- In both markets, buyers and sellers are **price takers**.
- In the short-run production, labor is the only variable input, where capital is fixed.
 - Wage (input price) is determined by the labor market.
 - Producers in the output market take wage as given.

Supply of Labor Faced By Firm

Competitive Market



Firm



Firm's Demand for a Factor

- Firm will hire an additional worker as long as:
the additional cost (paid to additional worker) >
the additional revenue (received from additional worker).
- The additional cost for one extra unit of factor is called
“**marginal factor cost (MFC)**”.
- In this case, MFC is wage (w).
- The additional revenue received from one extra unit of factor is called “**marginal revenue product (MRP)**”:

$$MRP_L = MR \times MP_L.$$

Firm's Demand for a Factor (Cont'd)

- **Value of marginal product (VMP)** of labor is the marginal product of labor multiplied by the output price:

$$\text{VMP}_L = P \times \text{MP}_L.$$

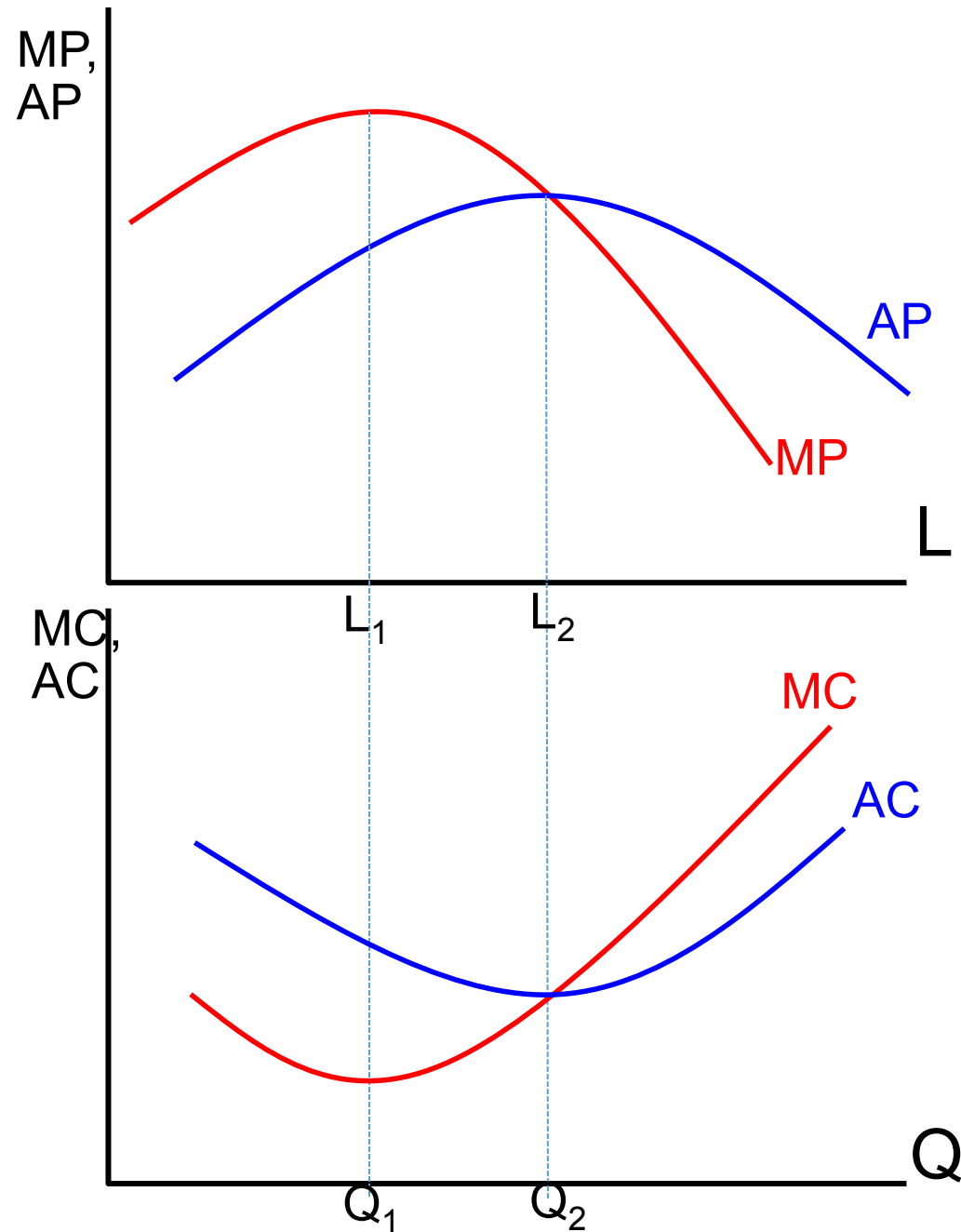
- In perfectly competitive market, $P = \text{MR}$.
- Hence,

$$\text{MRP}_L = \text{MR} \times \text{MP}_L = P \times \text{MP}_L$$

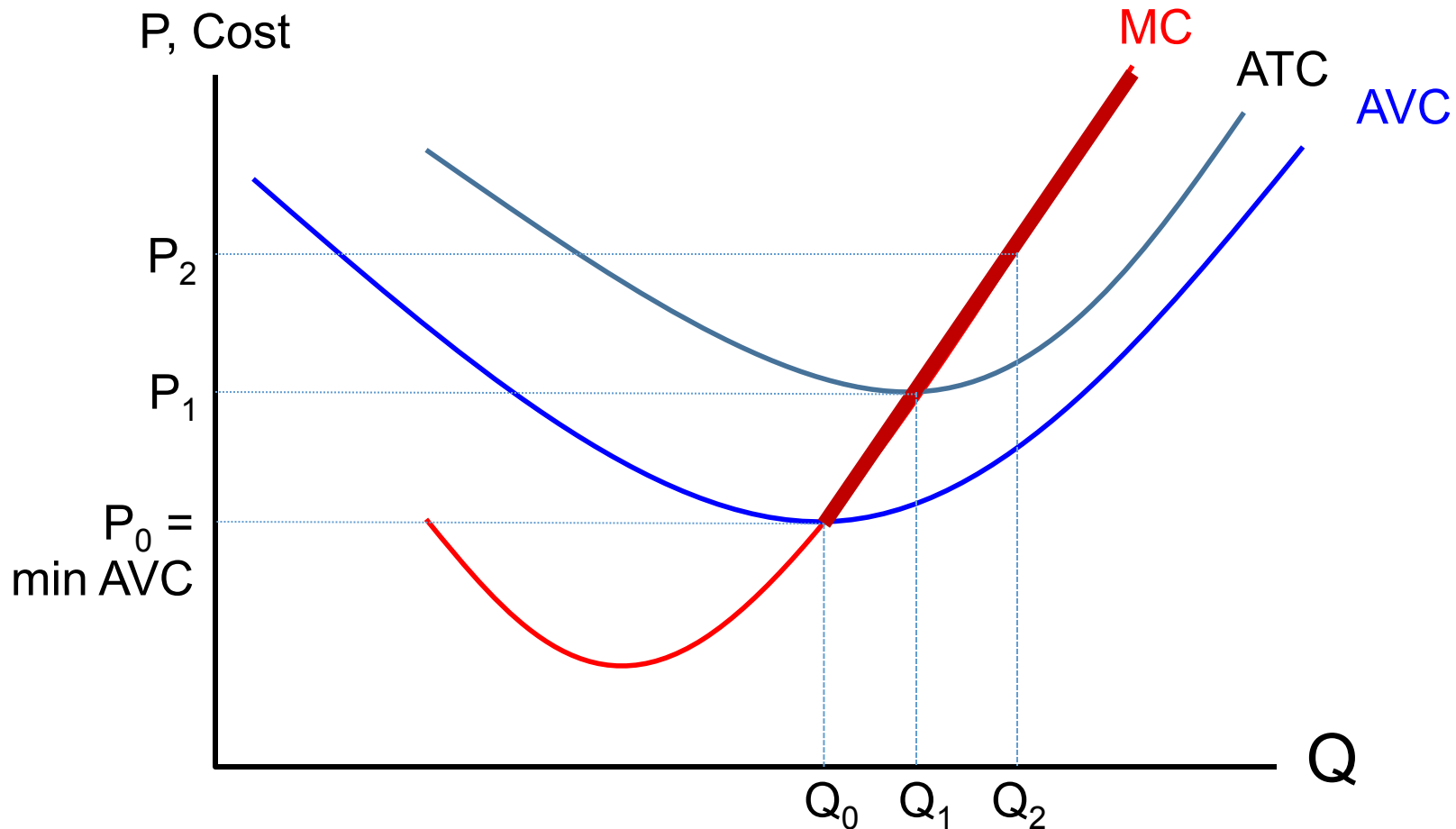
Example (Assume $P = 10$)

L	Q	MP	MR $= \Delta TR / \Delta Q$	TR = $P \times Q$	MRP $= \Delta TR / \Delta L$ $= P \times MP$
0	25			250	
1	40	15	10	400	150
2	75	35	10	750	350
3	100	25	10	1000	250
4	120	20	10	1200	200
5	130	10	10	1300	100

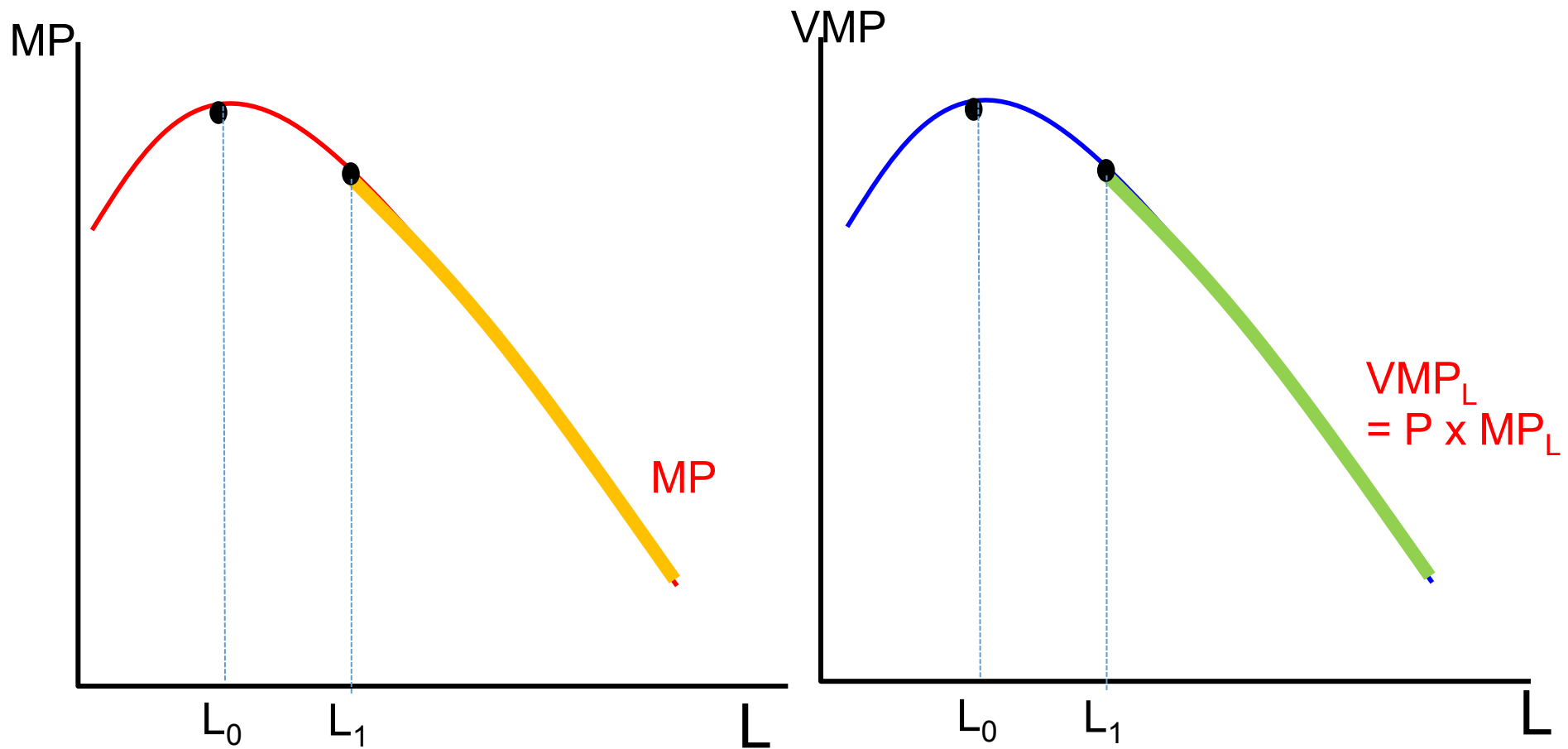
Relationship between MP&AP and MC&AC



Firm's Short-Run Supply Curve in Perfect Competition

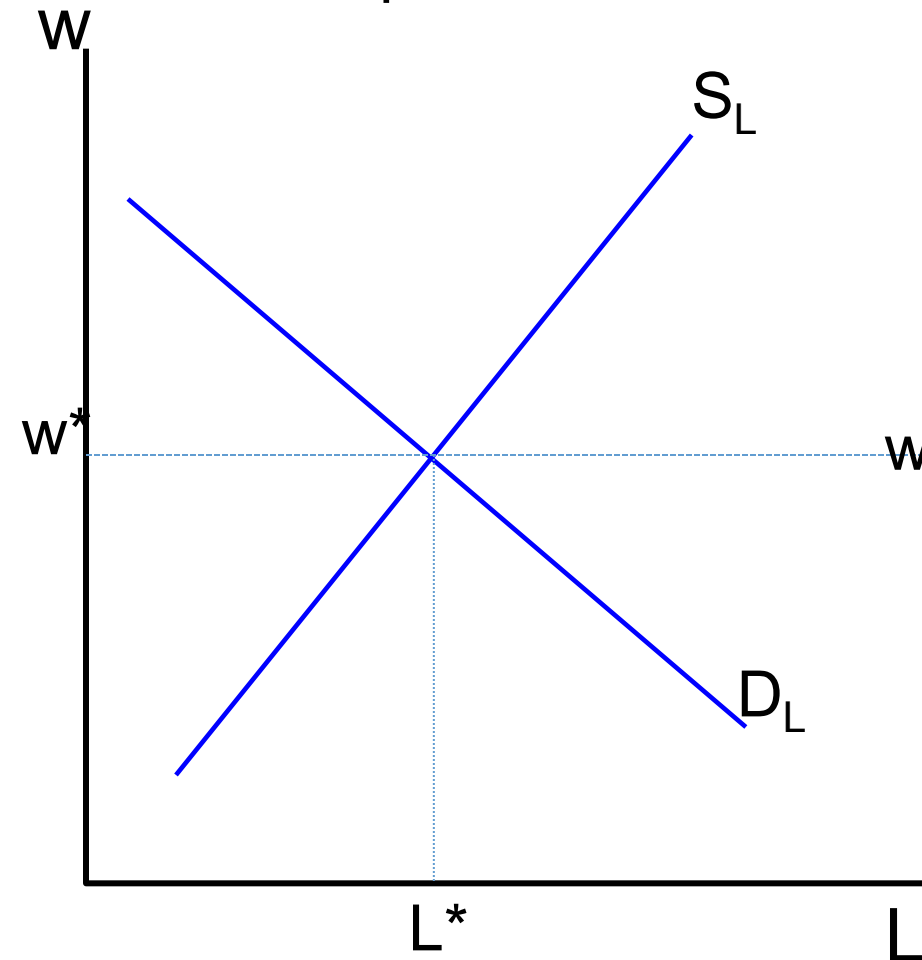


The Firm's Demand Curve for a Factor

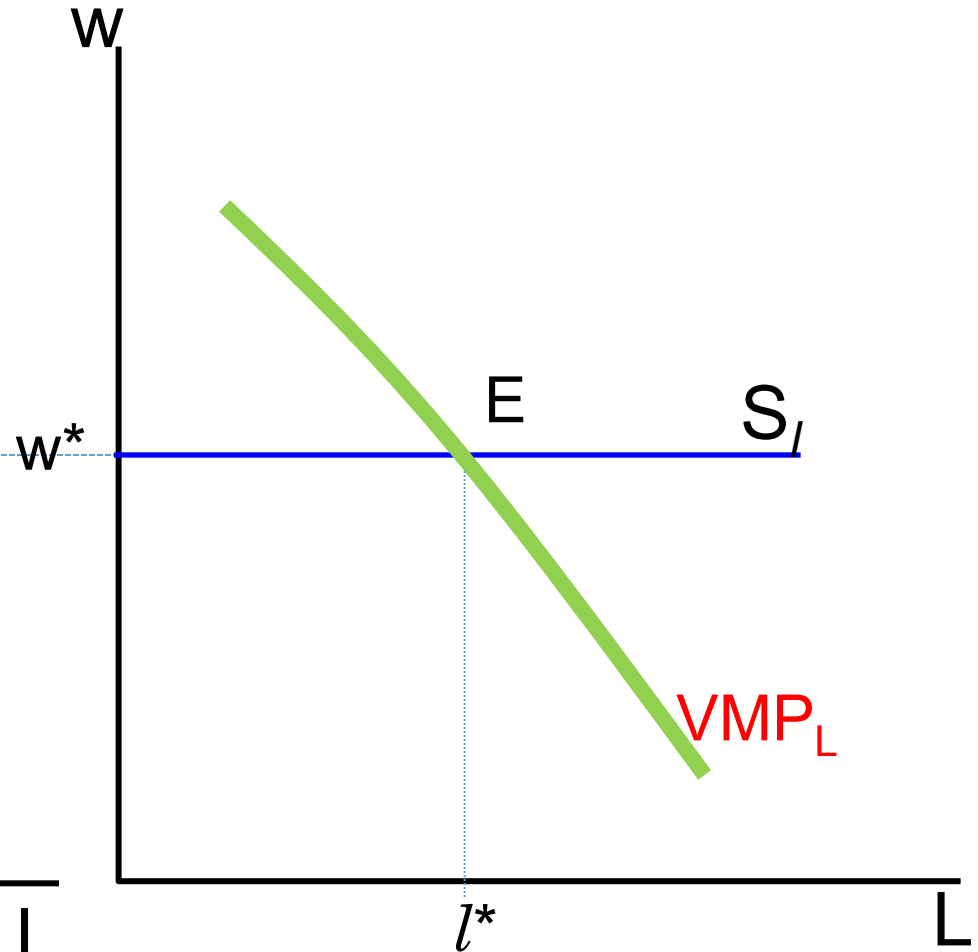


Equilibrium in the Labor Market

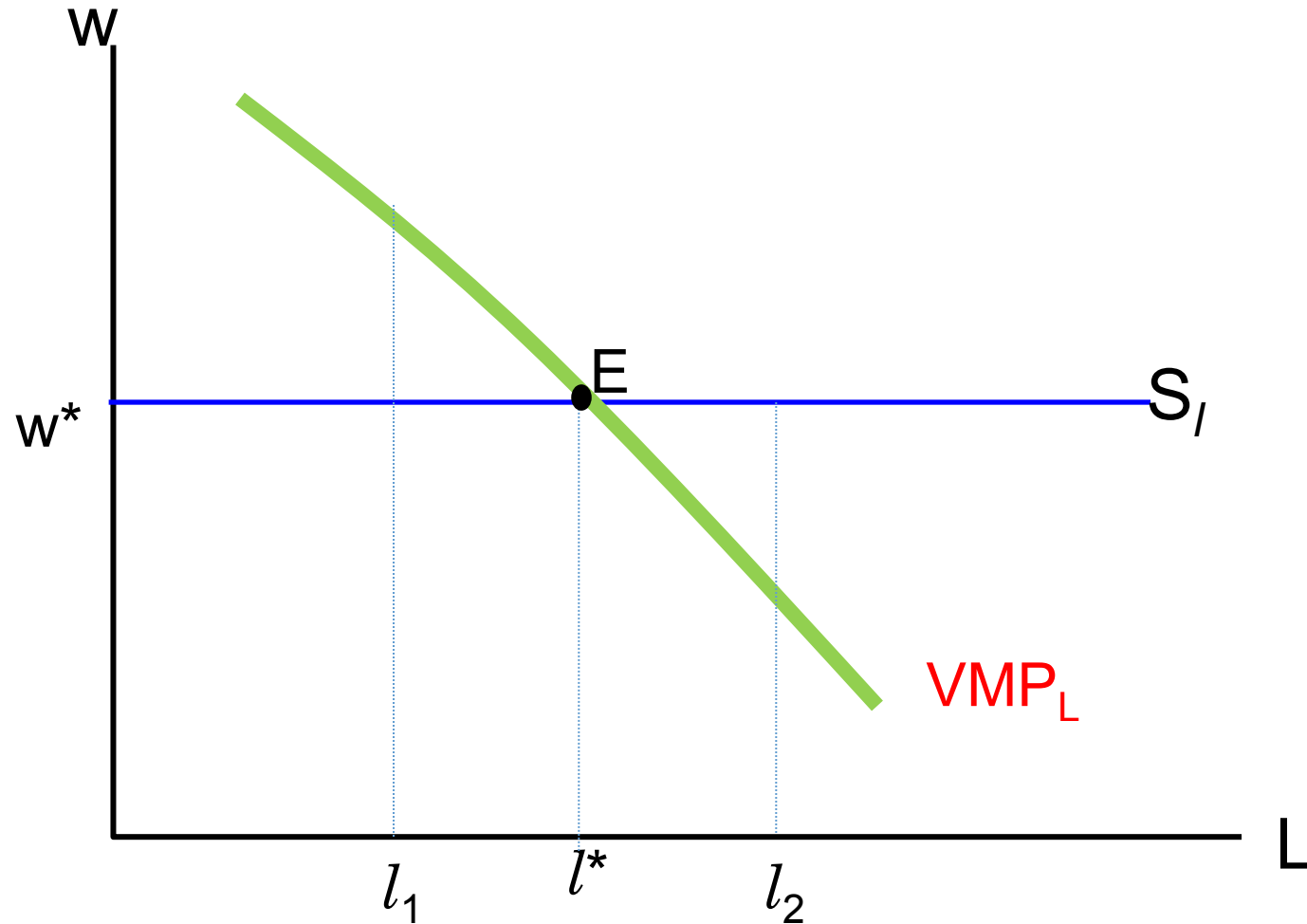
Competitive Market



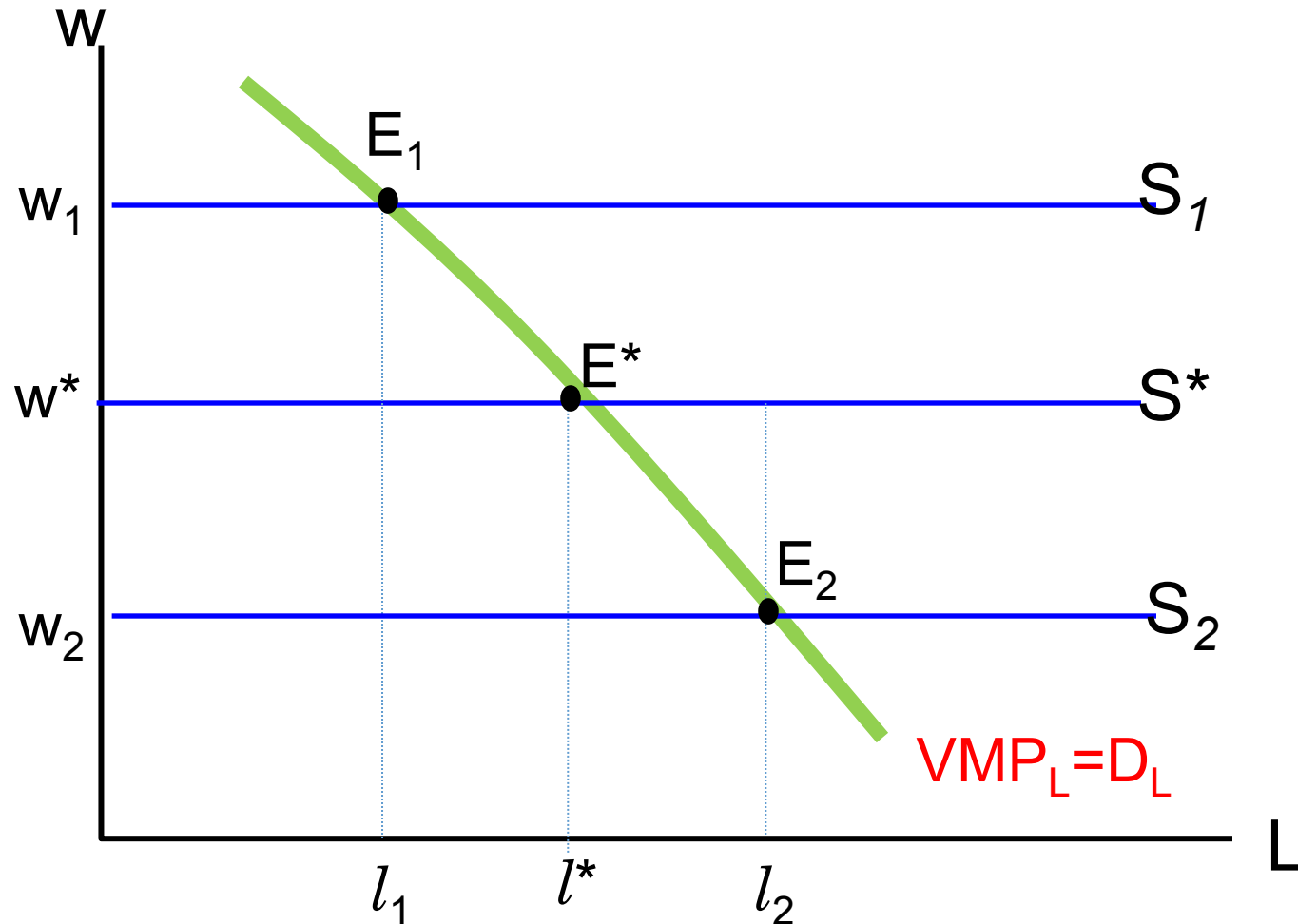
Firm



Firm's Decision in Hiring Labor



Firm's Derived Demand for Labor

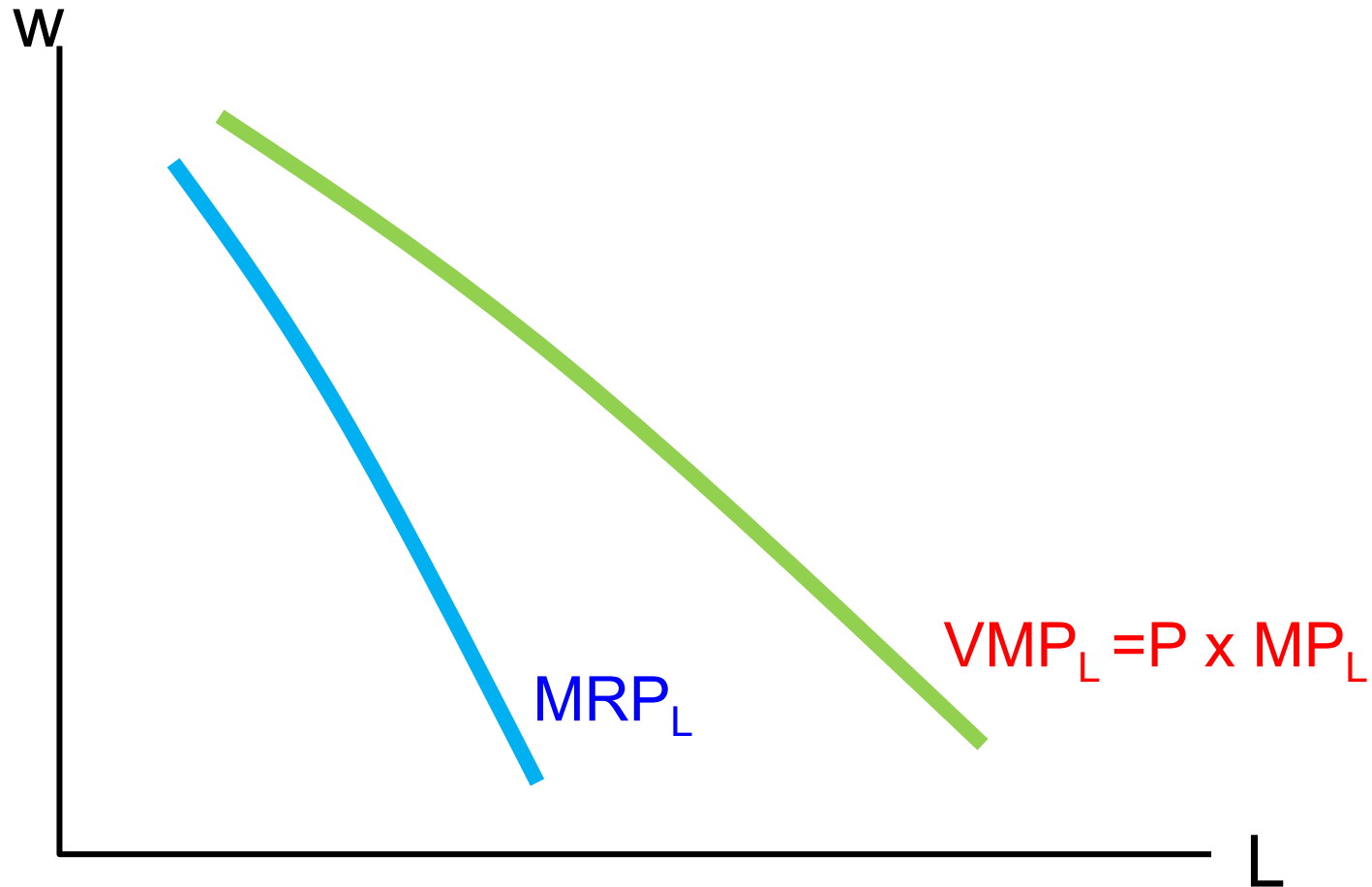


COMPETITIVE FACTOR MARKET & MONOPOLY OUTPUT MARKET

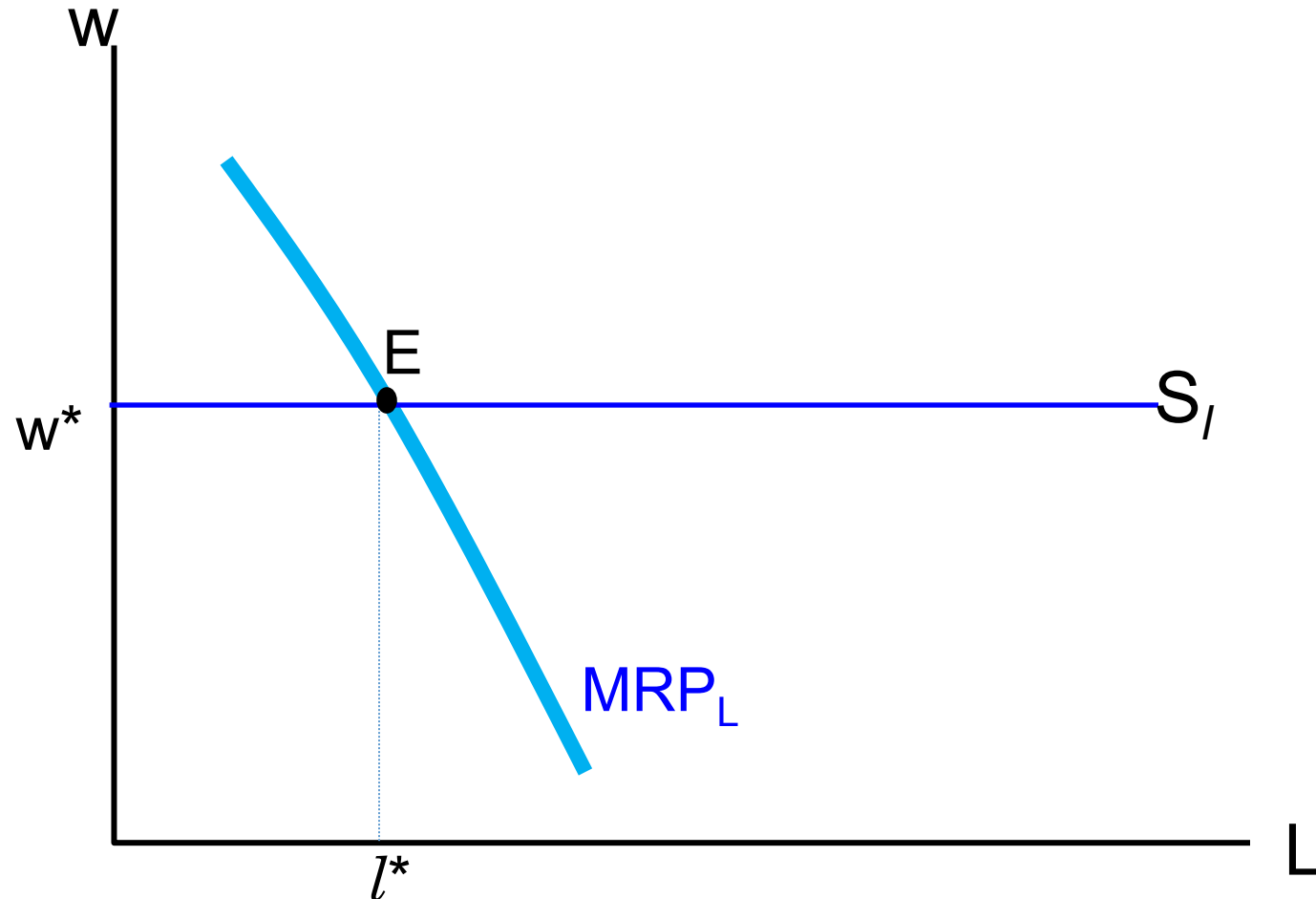
Assumptions

- There are many buyers and sellers in the factor market, but there is only seller in the output market.
- In factor markets, buyers and sellers are **price takers**.
- In output market, seller is the **price setter**.
 - **Set price where $MR = MC$.**
- In this case, **$MRP_L = MR \times MP_L$** .

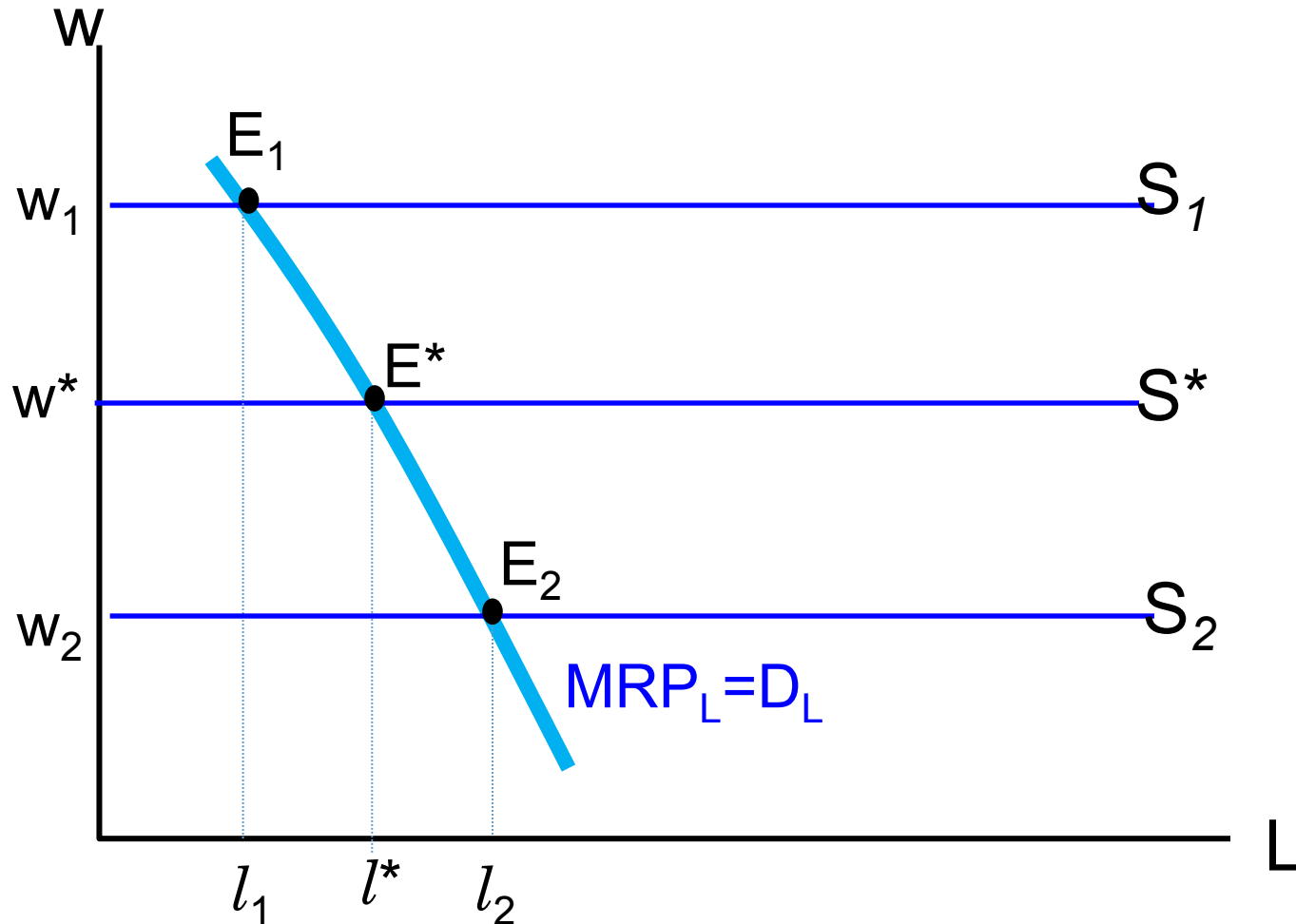
VMP and MRP in the Case of Monopoly Output Market



Equilibrium (Monopoly Output Market)



Firm's Derived Demand for Labor



Comparison

