Econ Land, Markets and Pareto Efficiency

Econ 1101

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ECON 1101 Lecture 4.1

1. Review EconLand and gains from trade

2. Pareto Efficiency

3. Link between PE and market allocation

ECON 1101 Lecture 4.1

1. Review of EconLand and Gains from Trade

(a) Marginal cost and marginal benefit Curves

(b) Market economy S, D

(c) Surpluses and gains from trade

1. Reservation Prices

Table of Reservation Values

Name	Reservation price for one widget
D1	9
D2	8
D3	7
D4	6
D5	5
D6	4
D7	3
D8	2
D9	1
D10	0

1. Reservation Prices

Table of Reservation Cost

Name	Cost of one widget (dollars)
S1	1
S2	2
S3	3
S4	4
S5	5
S6	6
S7	7
S8	8
S9	9
S10	10

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S9	9
S10	10

2. Marginal Benefit and Marginal Cost

Now think of D people as a group and S people as another group
Two important concepts

- **Marginal Benefit**: The value of the next one in
- or additional value to buyers as a group that the next unit provides
- **Marginal Cost**: the cost of the next one in
  - think of the additional cost to sellers as a group due to the next unit
- So we can graph reservation values as Marginal Cost and Marginal Benefit Curves

2. Marginal Benefit and Marginal Cost

Table of Reservation Values

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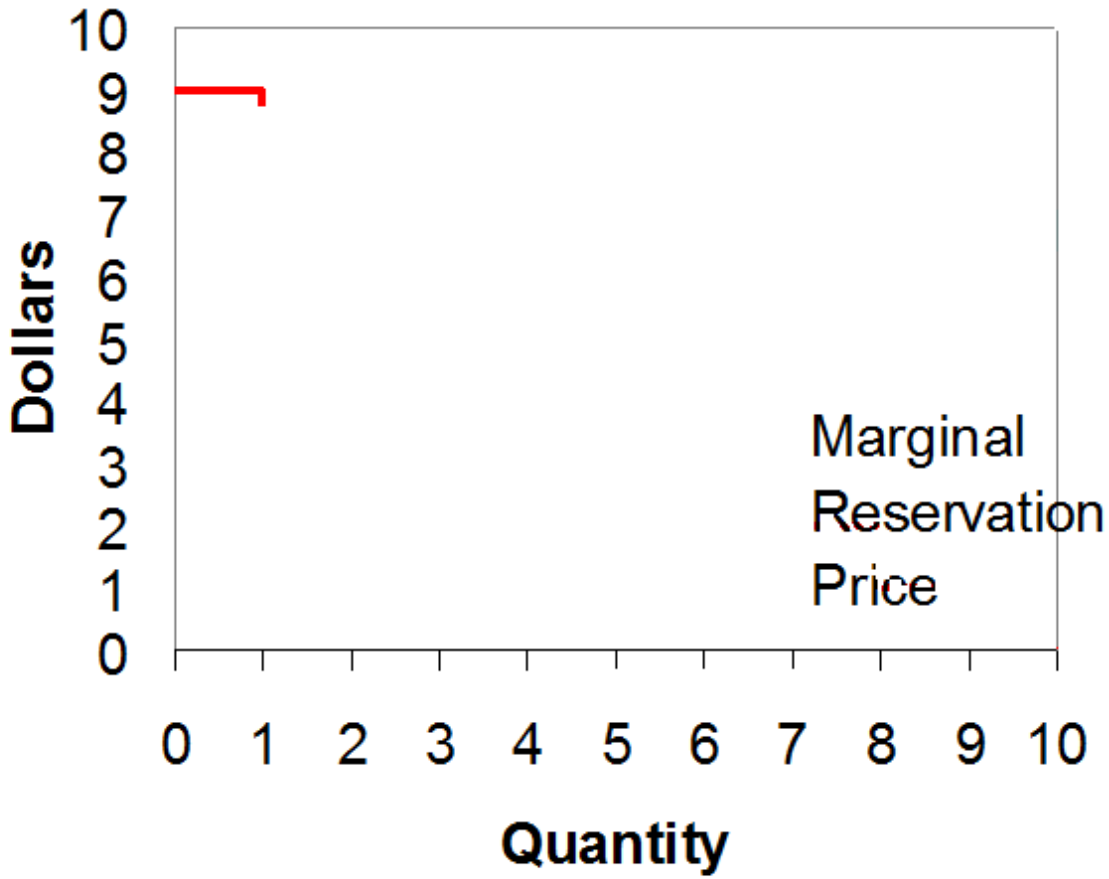

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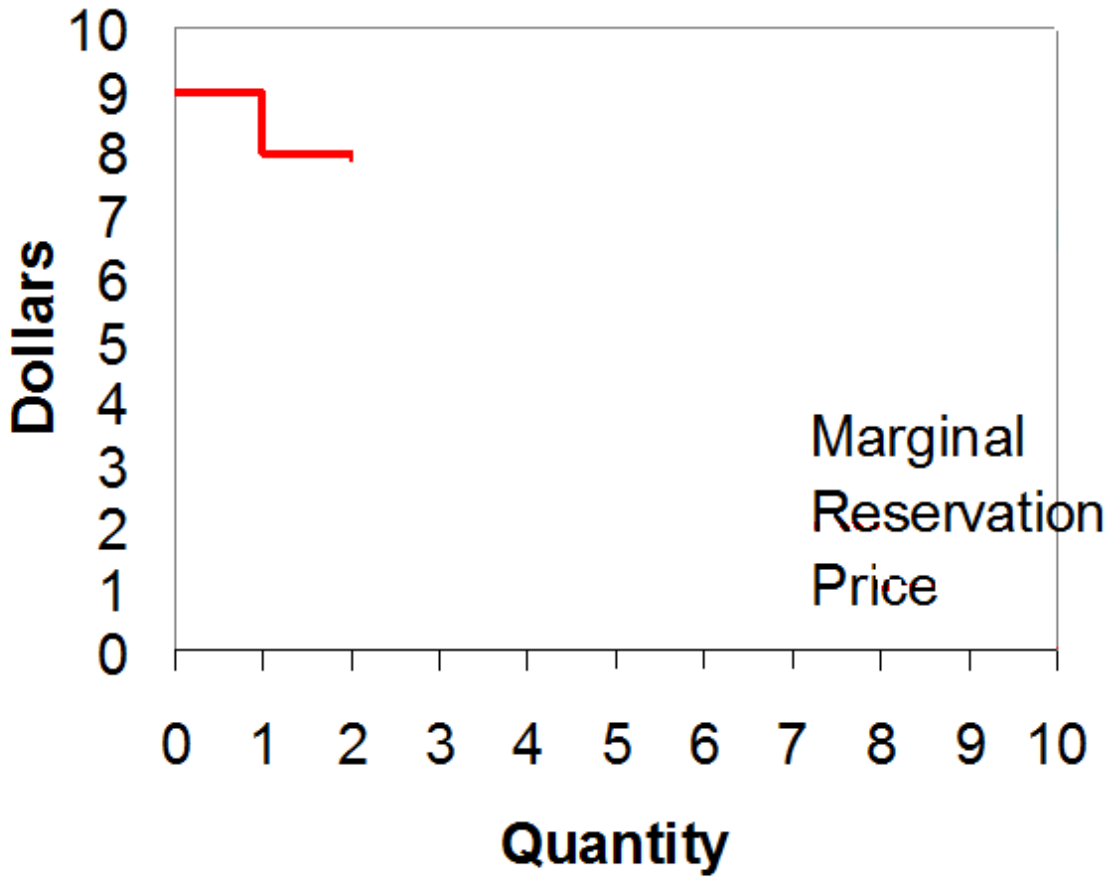

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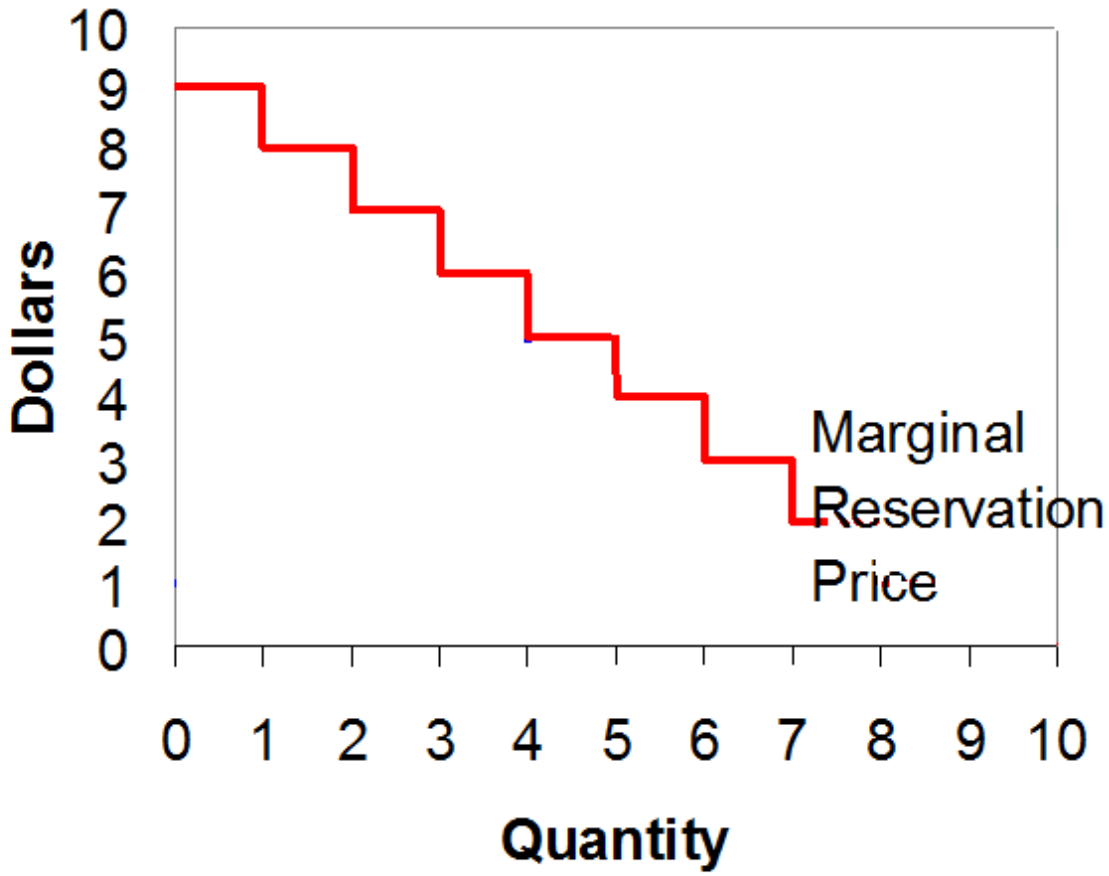

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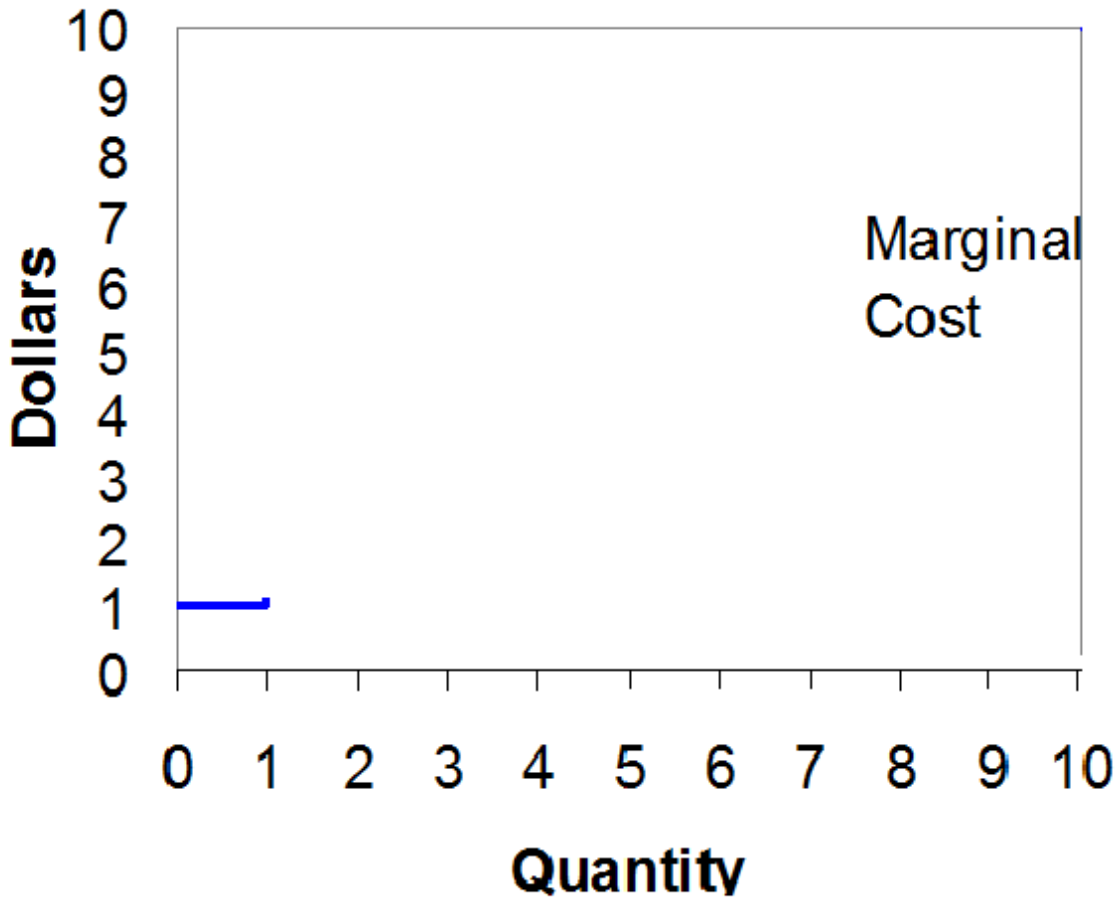

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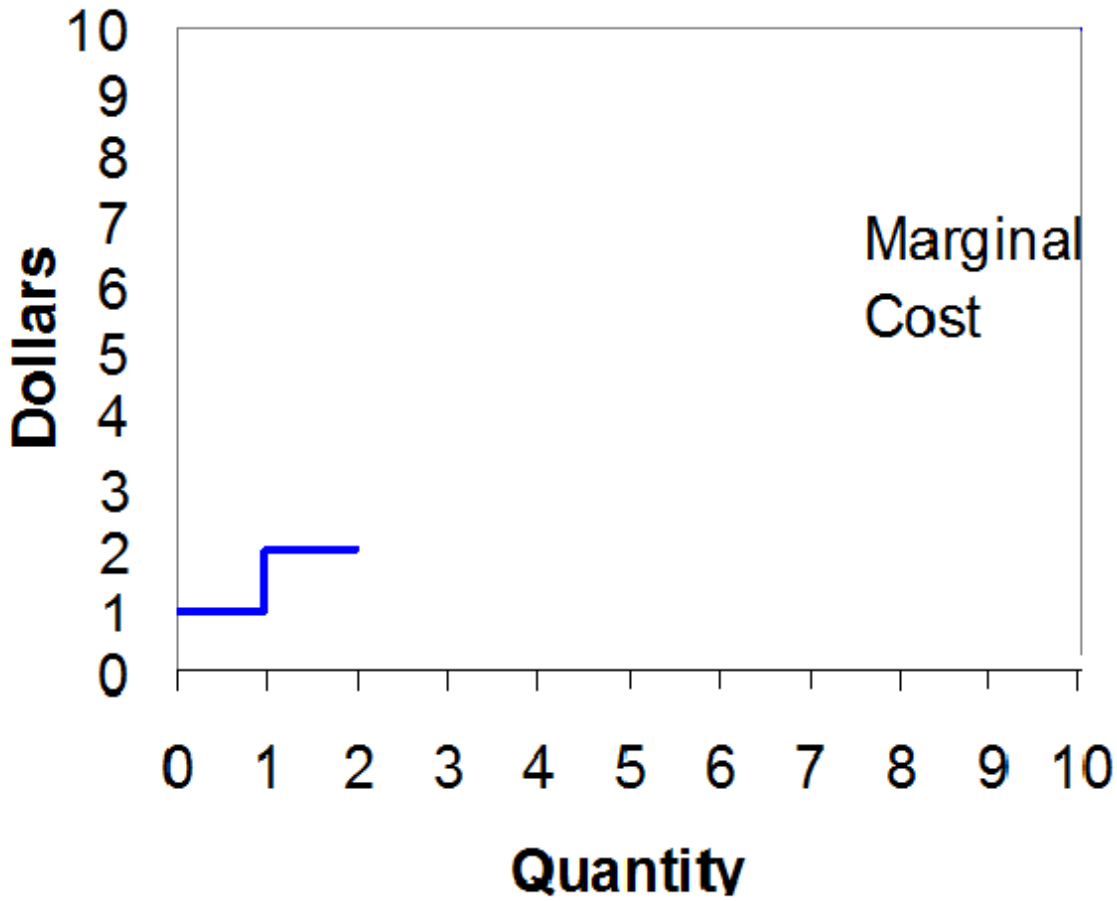

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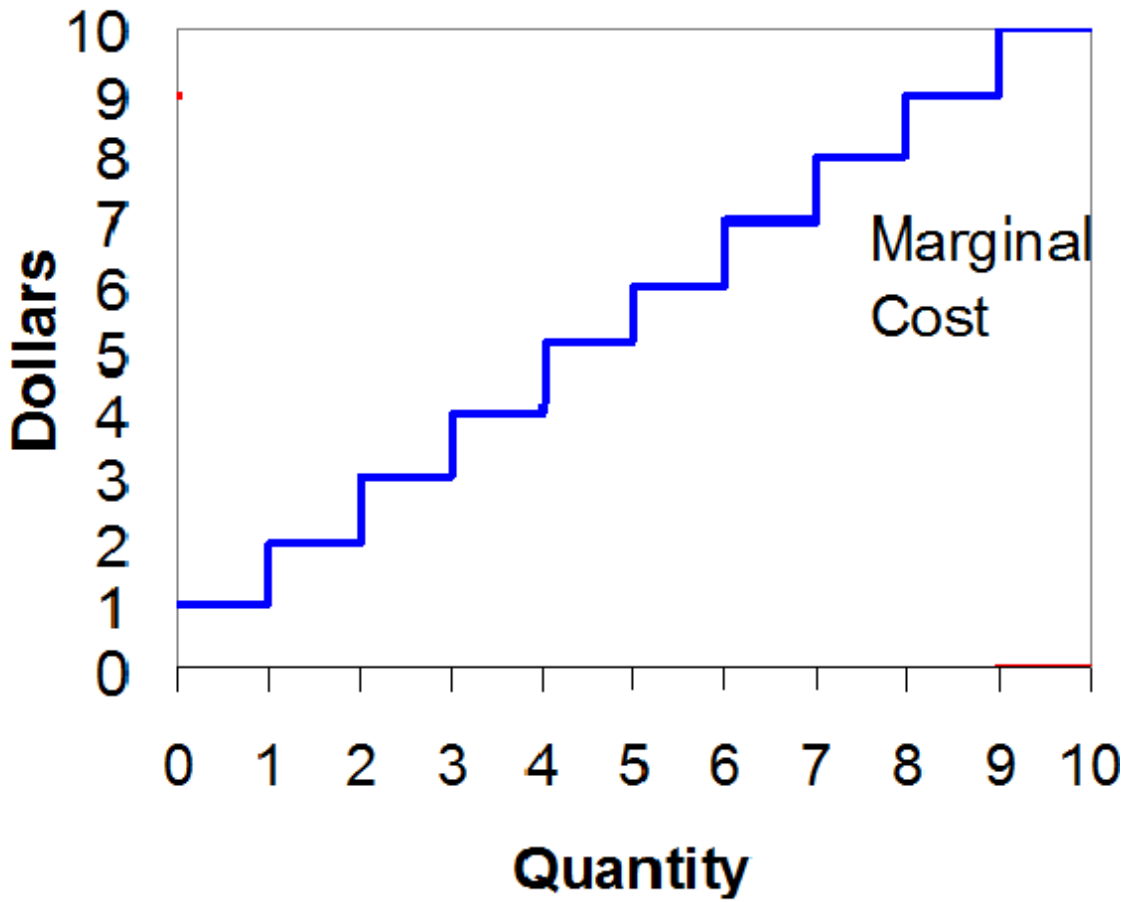

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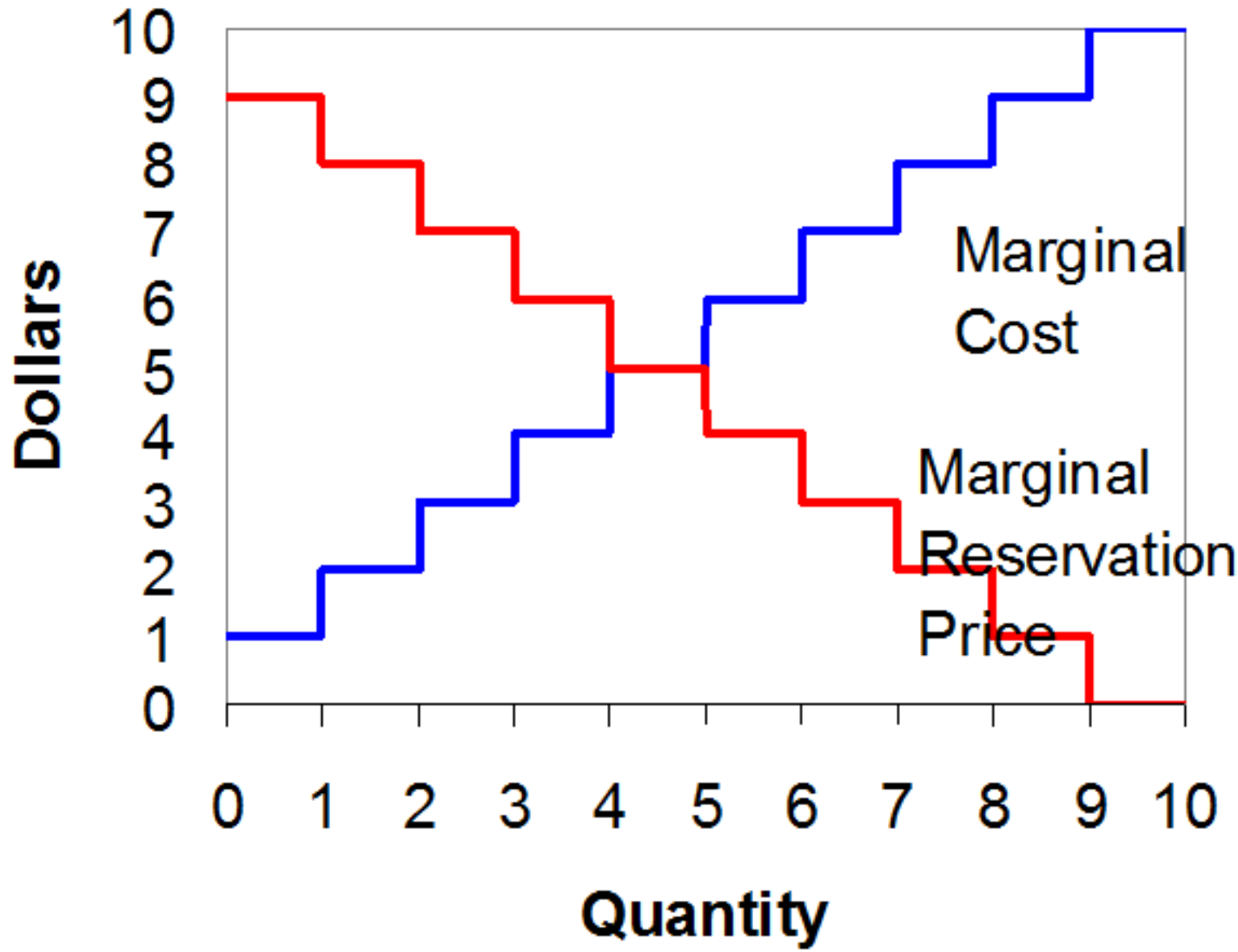

3. Set up a Market Economy in EconLand

Name	Res. Price	Cost	Name
D1	9	1	S1
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D3	7	3	S3
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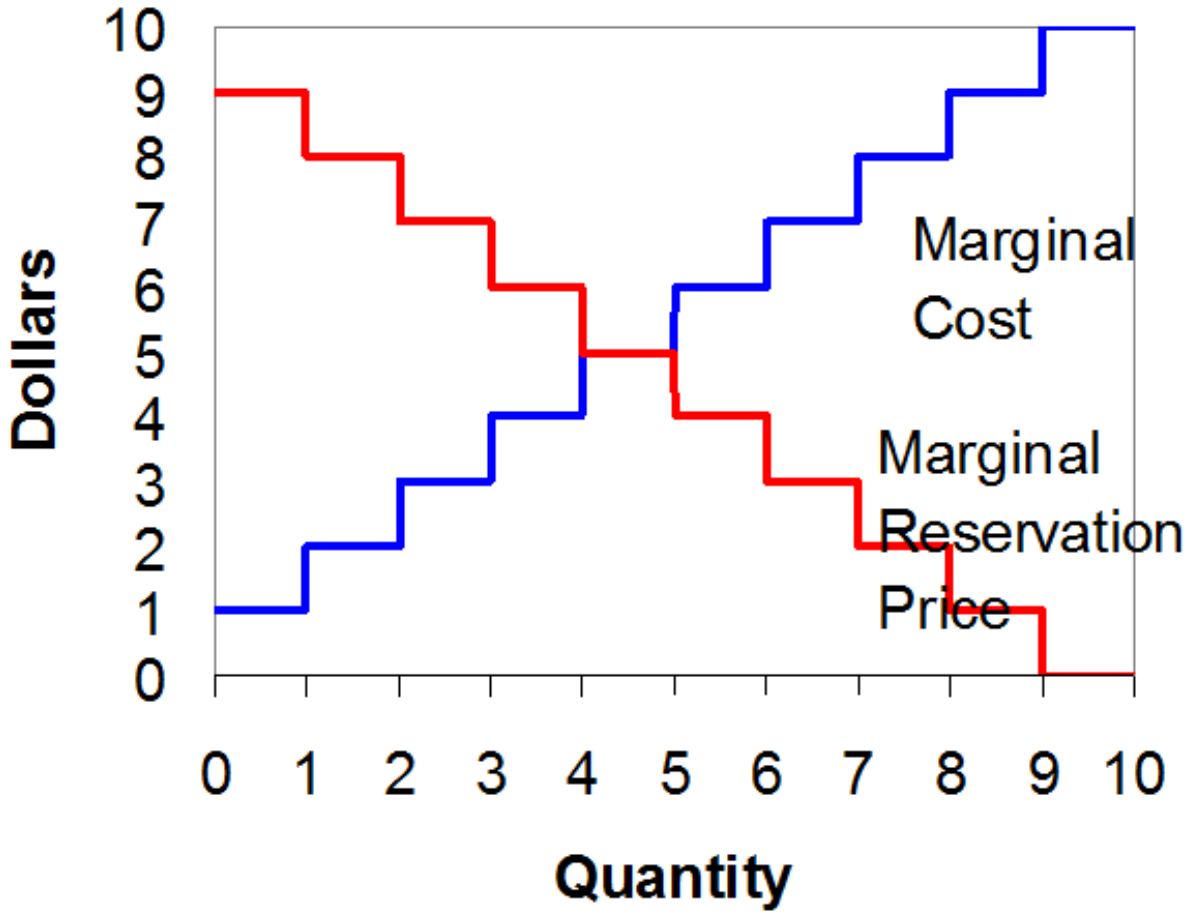
D9	1	9	S9
D10	0	10	S10



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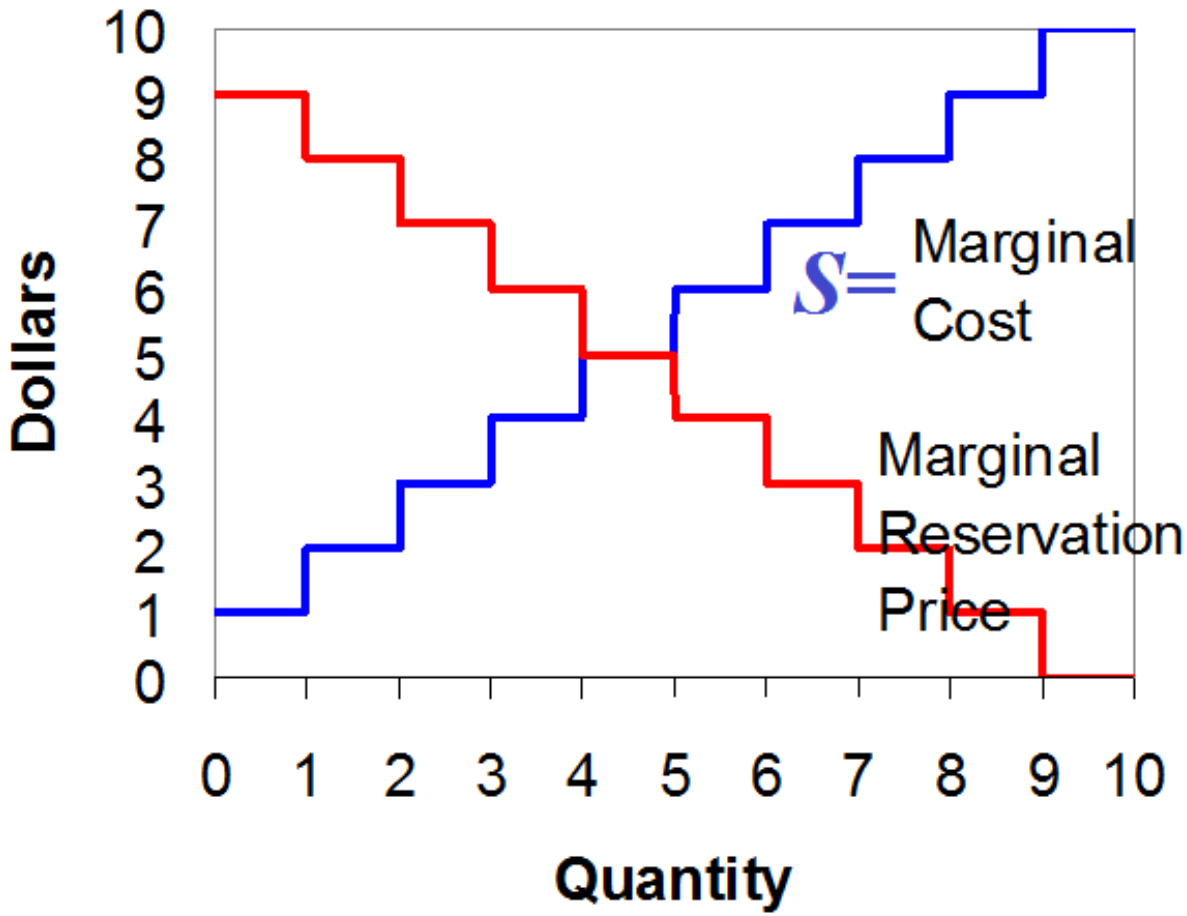

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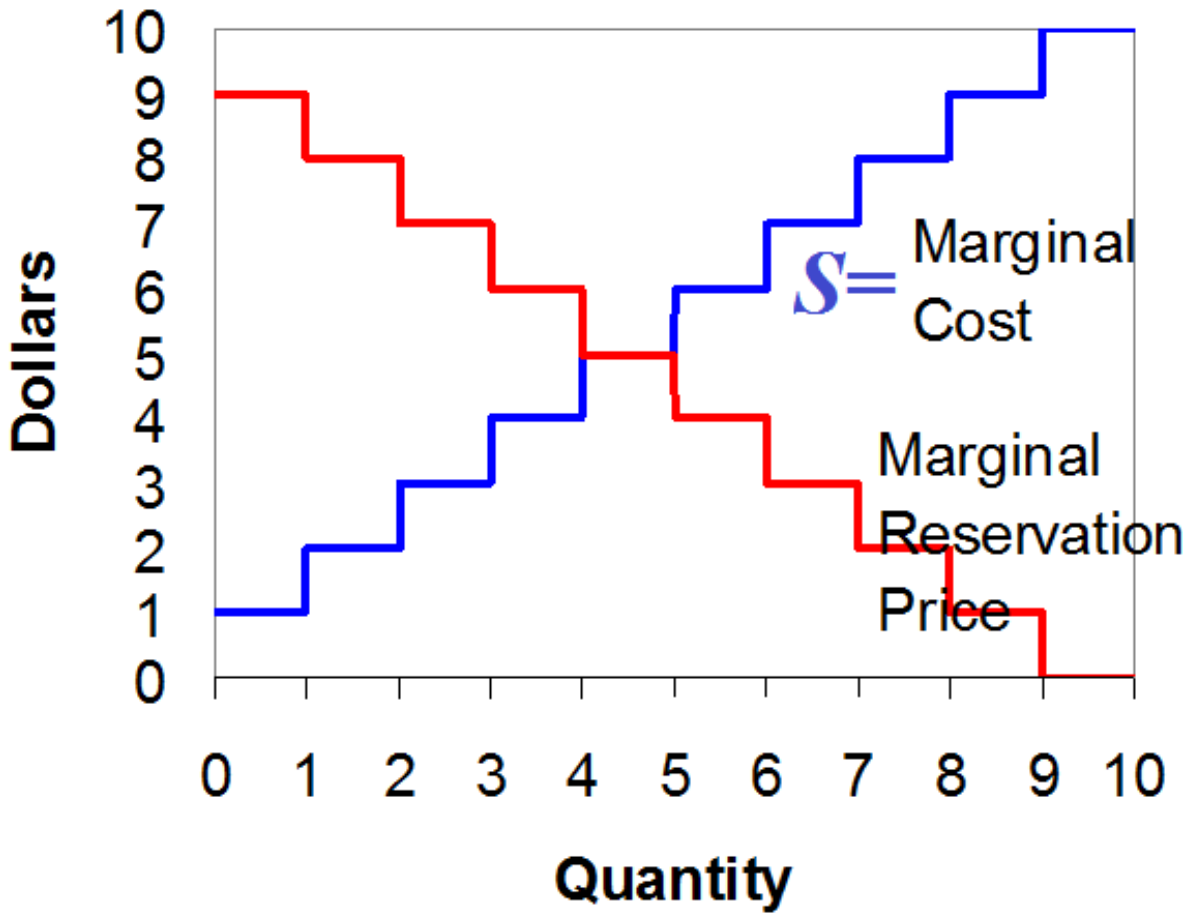

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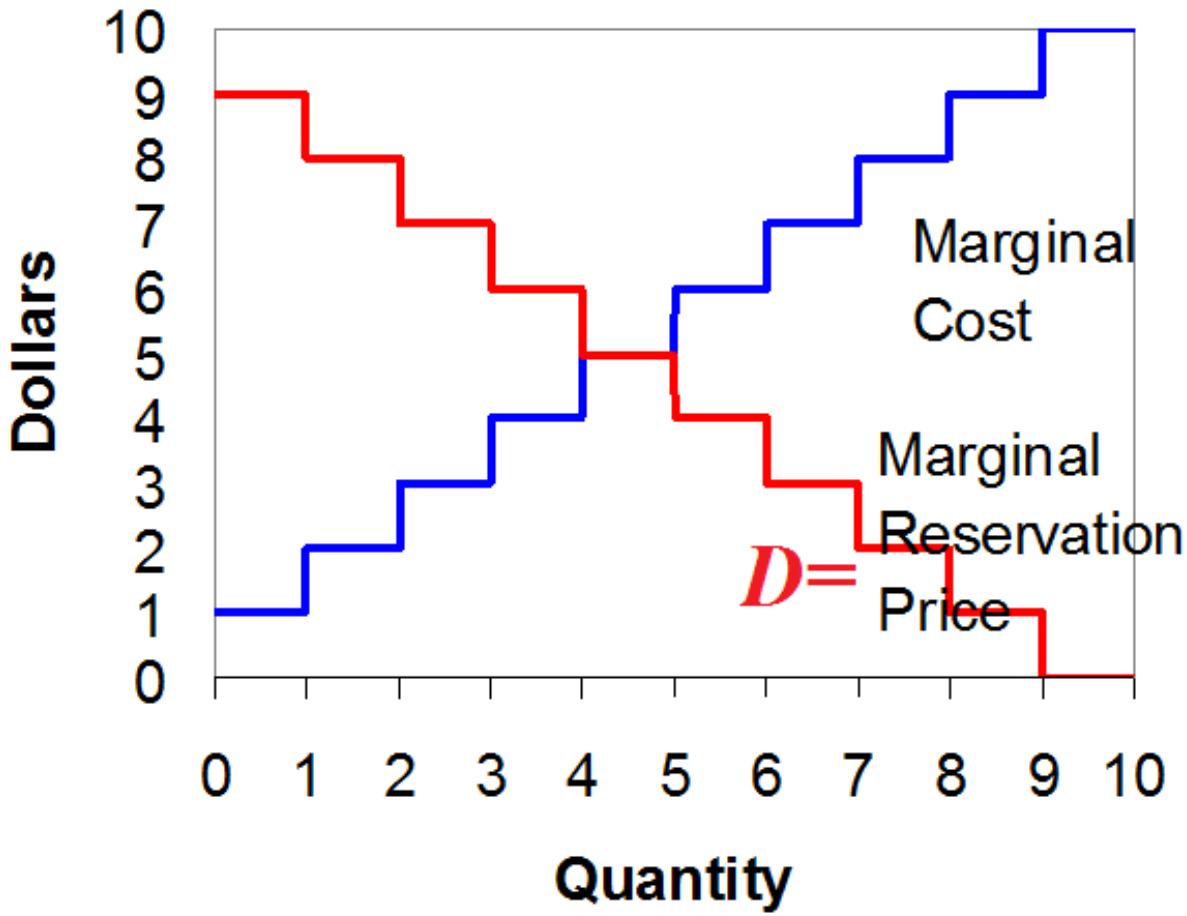

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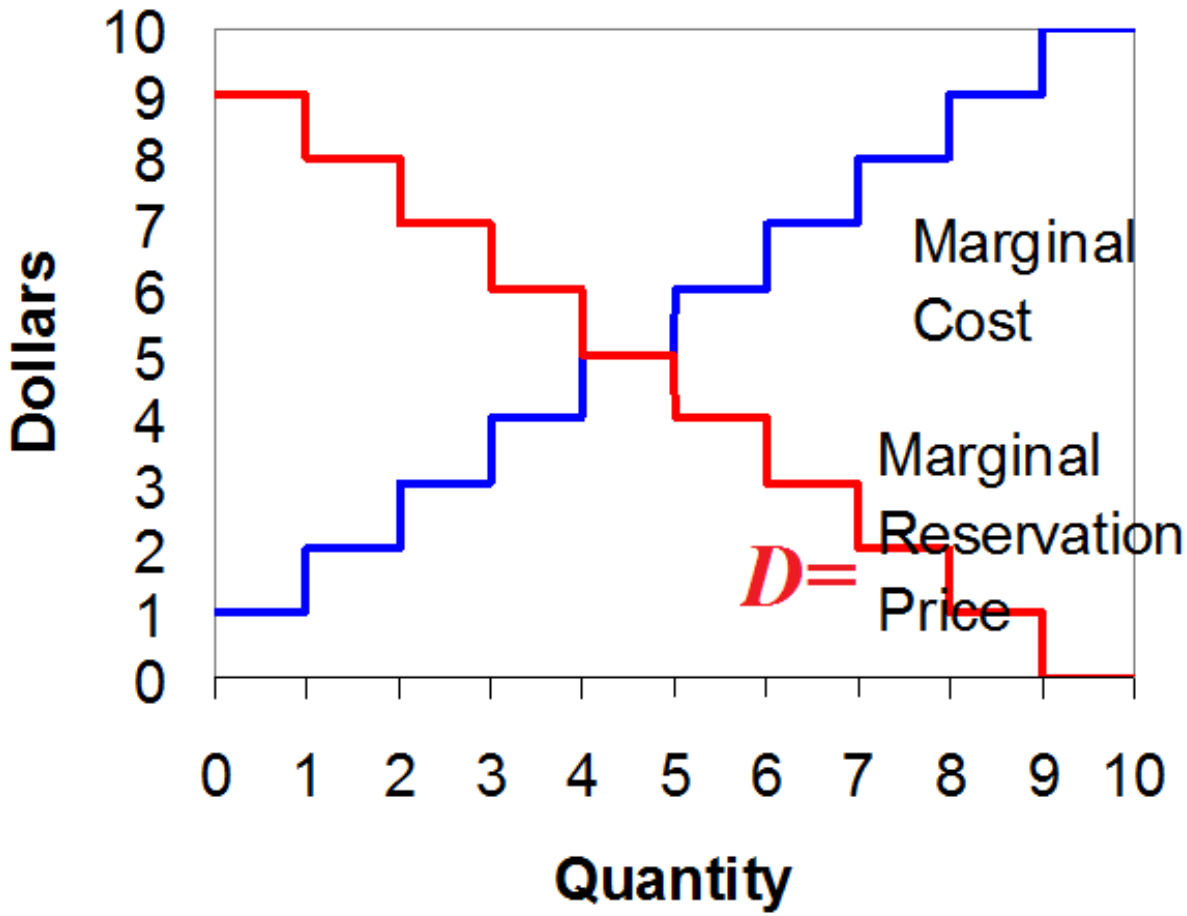

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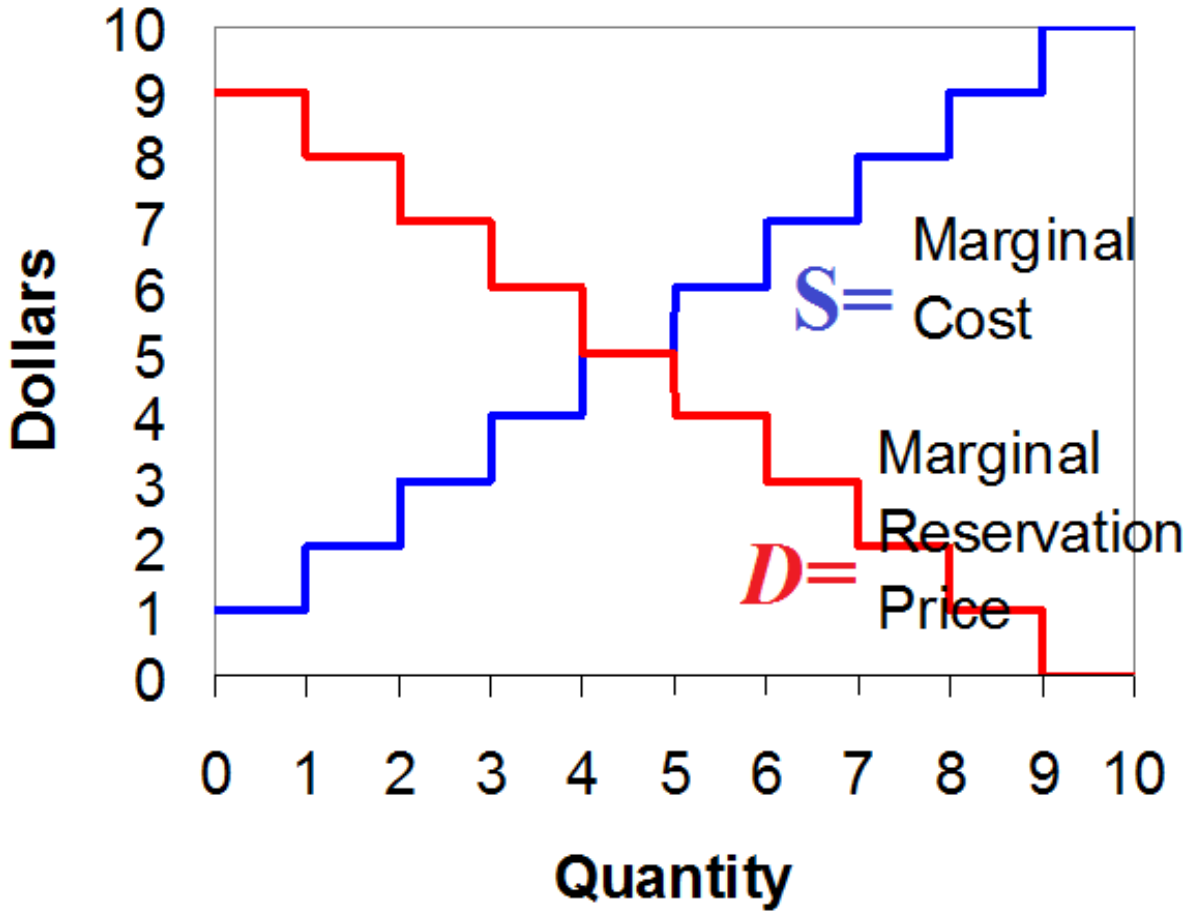

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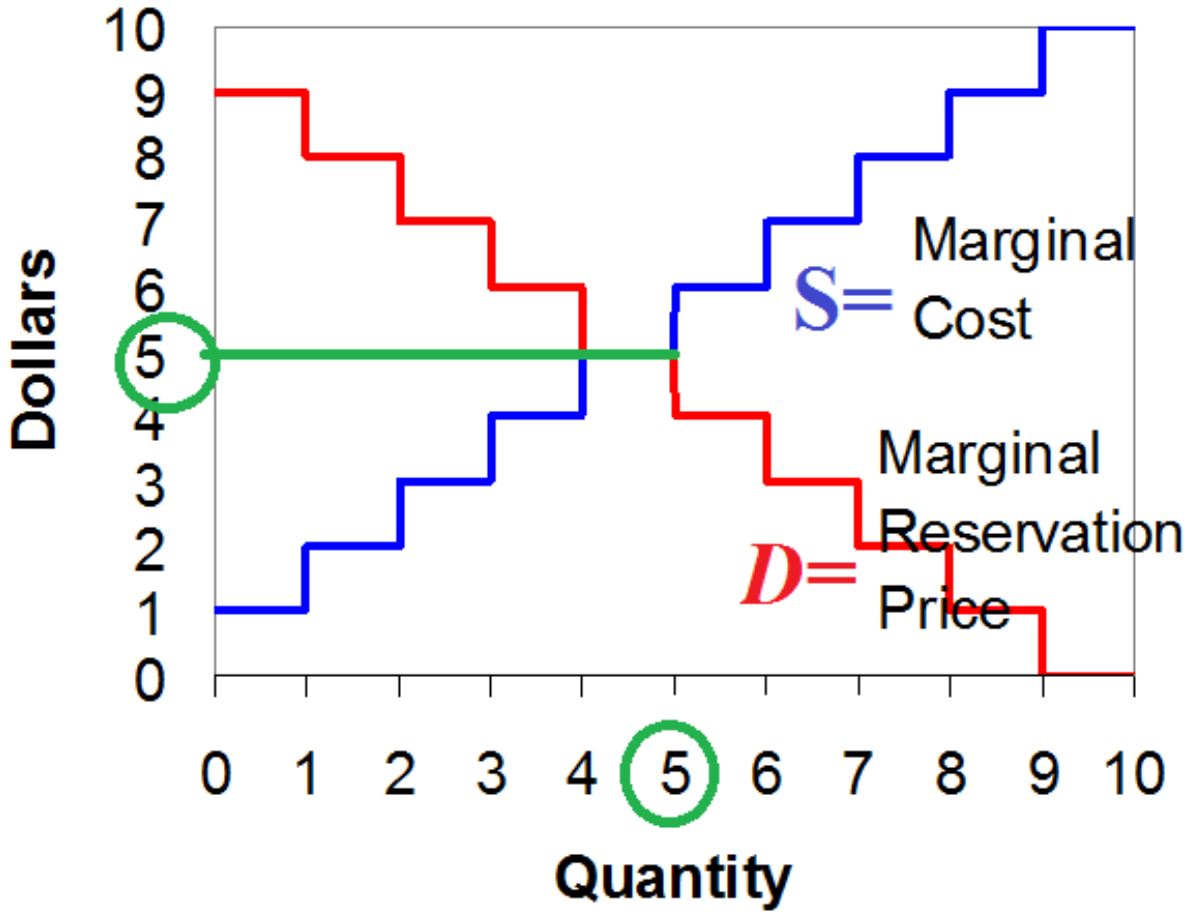


3. Market economy: Equilibrium

- From the Marginal Cost Curve we will derive the Supply Curve
- From the Marginal Benefit Curve, the demand Curve
- The market will determine the P, Q and the Who: Market Clearing or Market Equilibrium

- What happens when ECON LAND is a market Economy?
  - Q=5 (quantity produced and consumed)
  - P=5 (price of widget)
  - S1, S2, S3, S4,S5 produce
  - D1, D2, D3, D4,D5 consume

4. Gains from Trade and Surpluses

Definitions: Surpluses

- Consumer surplus of particular buyer = reservation price – price paid
- Producer surplus of seller = price received – cost
- Total Surplus (of Econ Land) = Total CS + Total PS
  - Total CS = sum of CS of consumers willing tu buy at P(E)
  - Total PS = sum of PS of producers willing to sell at P(E)
- Total Surplus is the sum of the "profits or gains" that consumers and producers will get if they engage in trade in our market.

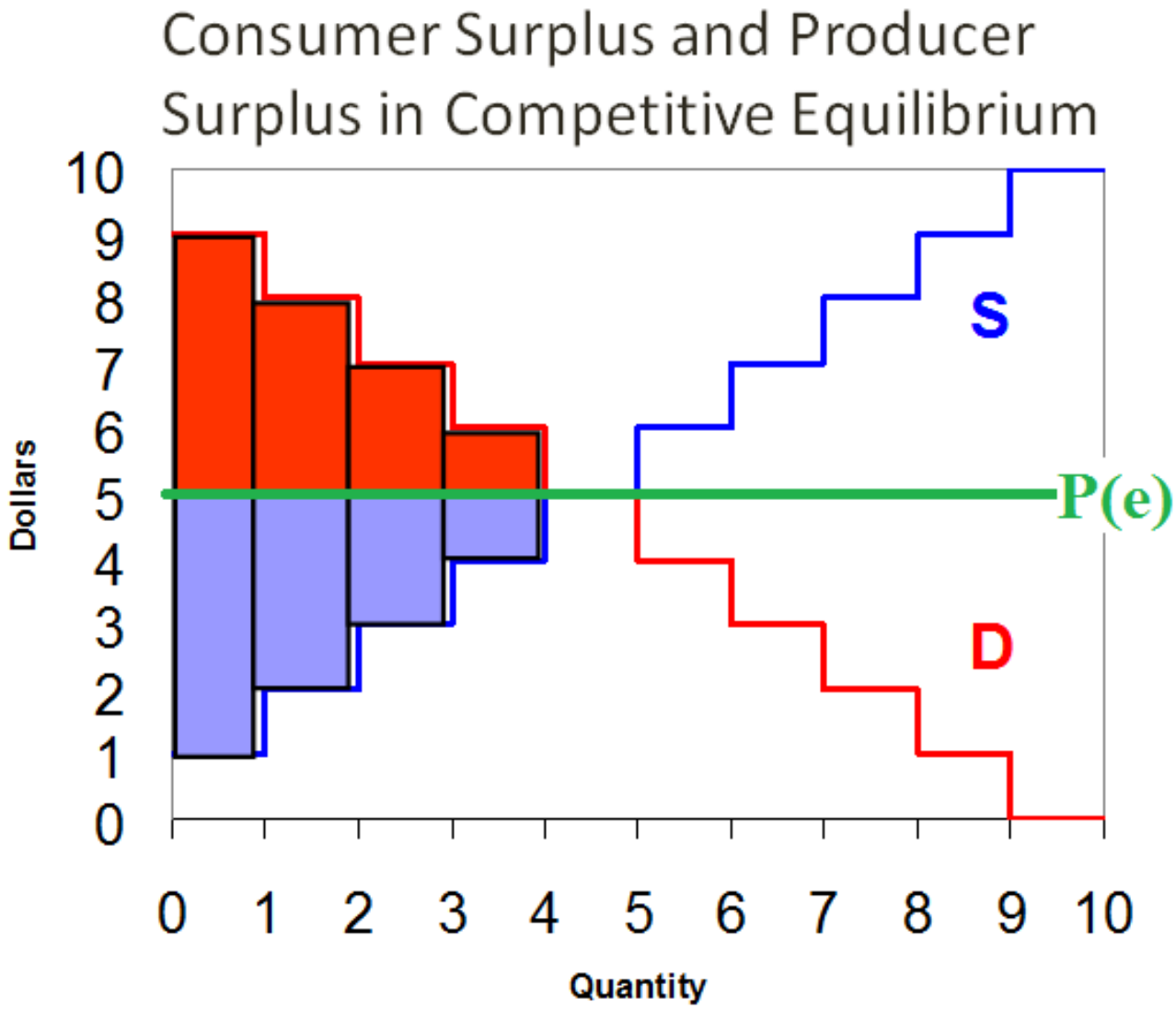
Consumer and Producer individual surpluses and TS

Q	Res. Price	price paid	CS	Price rec.	Cost	PS
1	9	5	4	5	1	4
2	8	5	3	5	2	3
3	7	5	2	5	3	2
4	6	5	1	5	4	1
5	5	5	0	5	5	0
6	4	-	0	-	6	0
7	3	-	0	-	7	0
8	2	-	0	-	8	0
9	1	-	0	-	9	0
10	0	-	0	-	10	0
Total			10			10

TS = CS + PS

20 = 10 + 10

CS and PS GRAPHICALLY



Consumer and Producer Surplus

Consumer Surplus

Area between demand curve and price line

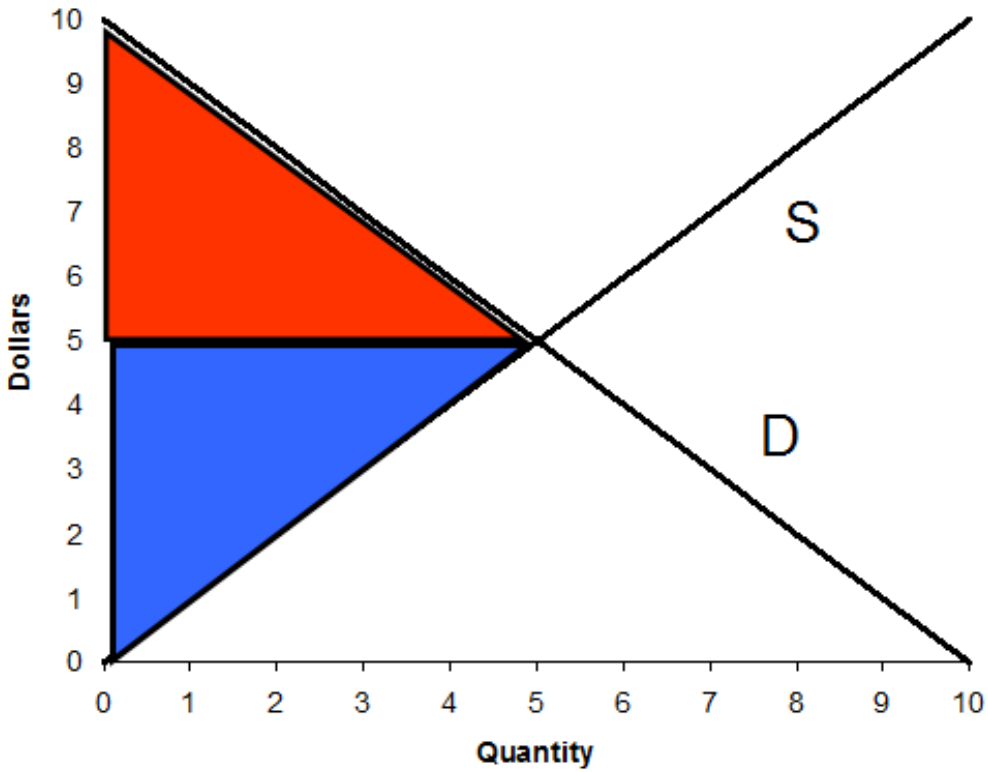
Producer Surplus

Area between price line and supply curve NOTE: In Econland, demand and

supply curves look like steps

- In an economy with lots of people, we won't notice the steps, things will smooth out
- this example had 10 people, but think about an economy with 1000 people, the steps will become smaller.
- Now think about an economy with infinitely many people

CS and PS: The General Case.



CS = Area of Triangle
= ½×5 ×5 = 12.5

PS = ½×5 ×5 = 12.5

TS = CS + PS = 25

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2. Pareto Efficiency

Pareto Efficiency

We just have the same supply and demand diagram that we've always been looking at.

- This is the case when the allocation is a **market allocation** (P, Q, and Who are determined competitively)

How should we interpret this new "Total Surplus"

- idea? Look at it like a "**Social surplus**"... or if it helps, a "Social pie"

Consumers get part of the social pie, producers get part of the social pie

But can we say that the **market allocation** is **efficient**?

What does it mean for an allocation to be efficient? We need a concept of efficiency.

- The standard concept in Economics is **Pareto Efficiency**

Pareto Efficiency

- Vilfredo Pareto 1848-1923

- An allocation is Pareto Efficient if it is feasible and there is no way to make someone better off without making someone worse off.
- Alternatively: The Pie is big as it can be. (If someone is to get a bigger slice, it can only come from someone else getting a smaller slice.)

Examples: Pareto Efficiency

There are 6 pieces of candy. Is the following allocation Pareto efficient?

2 pieces to student, 2 pieces to me, and 2 pies in trash.

Not Pareto efficient Because there exists an alternative feasible allocation that can make one person better off without making anyone worse off.

If we take 2 pieces out of trash and give both to me, I am better off and the student is not worse off. (Or we can give 1 pieces to the student and

1 pieces to me, and both are better off.)

Examples: Pareto Efficiency

How about 3 pieces for me, 3 pieces for student, and no pies in trash.
This is Pareto efficient. The only way to make the student better off is to take a piece from me. I will be worse off.

How about 6 pieces for me, 0 to student, and no pieces in trash.
This is Pareto efficient. Again, the only way to make the student better off is to take a pie from me

Note: the term "equity" does not show up in the definition of efficiency. So if the "pie" as as big as can be, the allocation can still be efficient even if one person gets the whole pie

Pareto Efficiency (MARKET) - Test your Knowledge

1. Suppose we have an allocation where D8 consumes a widget but D2 does not. Is this Pareto efficient?

Name	Res. Price	Cost	Name
D1	9	1	S1
D2	8	2	S2
D3	7	3	S3
D4	6	4	S4
D5	5	5	S5
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D9	1	9	S9
D10	0	10	S10

Pareto Efficiency (MARKET) - Test your Knowledge

1. Suppose we have an allocation where D8 consumes a widget but D2 does not. Is this Pareto efficient? **(Resale)**

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D8	2	8	S8
D9	1	9	S9
D10	0	10	S10

Pareto Efficiency (MARKET) - Test your Knowledge

2. Suppose we have an allocation where S7 produces a widget but S1 does not. Is this Pareto efficient?

Name	Res. Price	Cost	Name
D1	9	1	S1
D2	8	2	S2
D3	7	3	S3
D4	6	4	S4
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D7	3	7	S7
D8	2	8	S8
D9	1	9	S9
D10	0	10	S10

Pareto Efficiency (MARKET) - Test your Knowledge

2. Suppose we have an allocation where S7 produces a widget but S1 does not. Is this Pareto efficient? **(Outsourcing)**

Name	Res. Price	Cost	Name
D1	9	1	S1
D2	8	2	S2
D3	7	3	S3
D4	6	4	S4
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3. **Link between Pareto Efficiency and market allocation** (the Adam Smith Theorem)

Link betwwen PE and market allocation

Previous two allocations in EconLand were not Pareto Efficient.

Then what is a Pareto Efficient (PE) allocation in Econland?

- to solve this question lets look at the 3 general principles of efficient allocations

We will develop some concepts to make a link between PE allocations and market allocations

General principles of efficient allocation

1 Efficient allocation of consumption

In any eff. allocation, consumers with highest willingness to pay consume

- Fom previious example, D2 has higher willingness to pay than D8, but D8 consumes first, so this allocation is not efficient!
- **Resale**

2 Efficient allocation of production

In any efficient allocation, producers with the lowest cost produce

- Similarly when S7 has higher cost than S1, but S7 produces first, so this allocation is not efficient!
- **Outsourcing**

In both cases there are alternative deals that make both better off

What is the efficient quantity? Testing

When Q=3,

- There is someone out there (D4) not consuming who is willing to pay more than it will cost someone (S4) to produce.
- There is an alternative arrangement that can make both better off

So raise quantity

Name	Res. Price	Cost	Name
D1	9	1	S1
D2	8	2	S2
D3	7	3	S3
D4	6	4	S4
D5	5	5	S5
D6	4	6	S6
D7	3	7	S7
D8	2	8	S8
D9	1	9	S9

What is the efficient quantity? Testing

When Q=8,

- There is someone out there consuming (D8) who is willing to pay less than what it is costing someone (S8) to produce.

So lower quantity.

Name	Res. Price	Cost	Name
D1	9	1	S1
D2	8	2	S2
D3	7	3	S3
D4	6	4	S4
D5	5	5	S5
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D8	2	8	S8
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General principle 3

... From this we get:

3. Efficient Quantity

In any efficient allocation, the quantity is where the marginal valuation of the last unit consumed equals the marginal cost of the last unit produced.

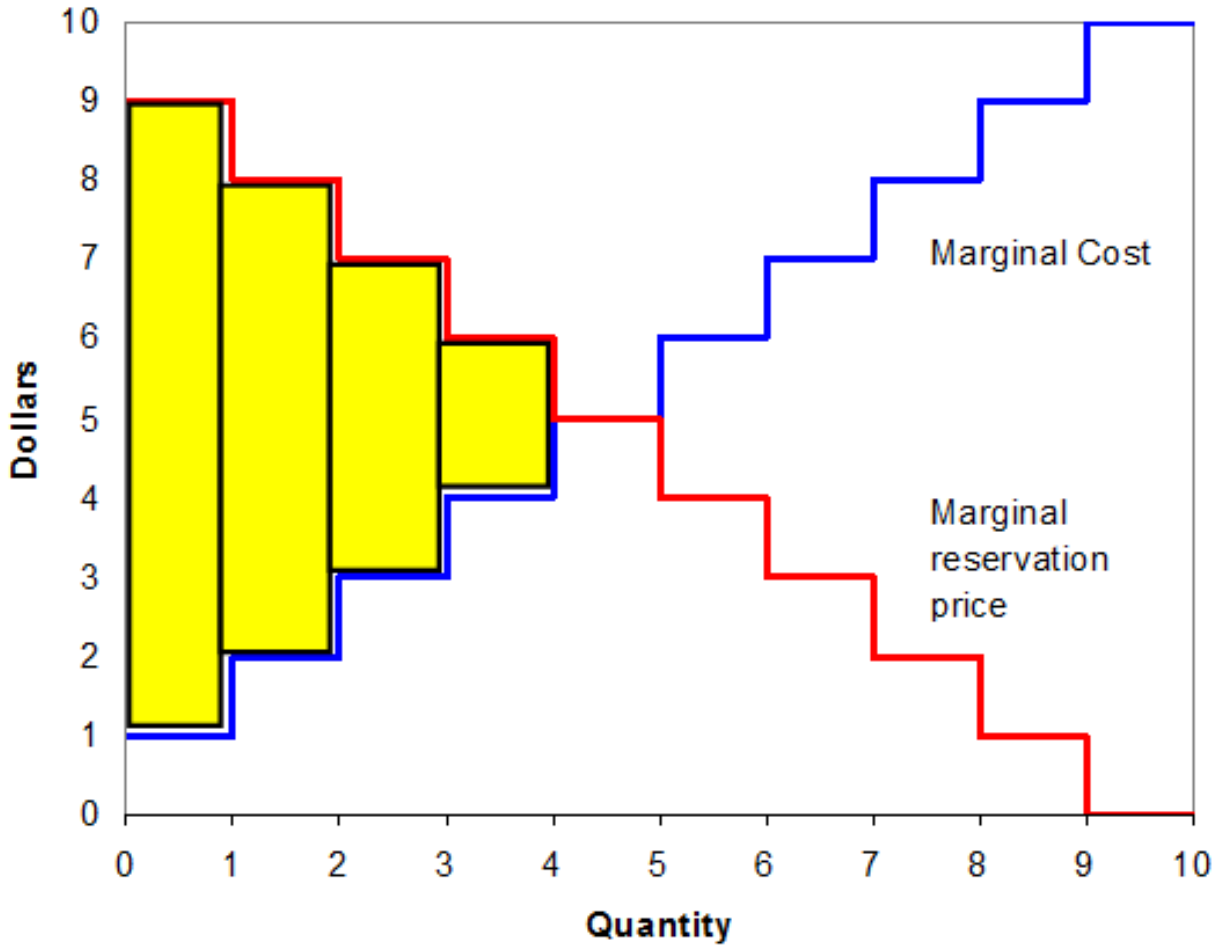
- This is where MgB curve intersects MgC curve

Principles 1, 2, and 3 imply that in an efficient allocation for the widget industry in Econland:

- **Q = 5**
- S1, S2, S3, S4, S5 produce
- D1, D2, D3, D4, D5 consume

Graphically....

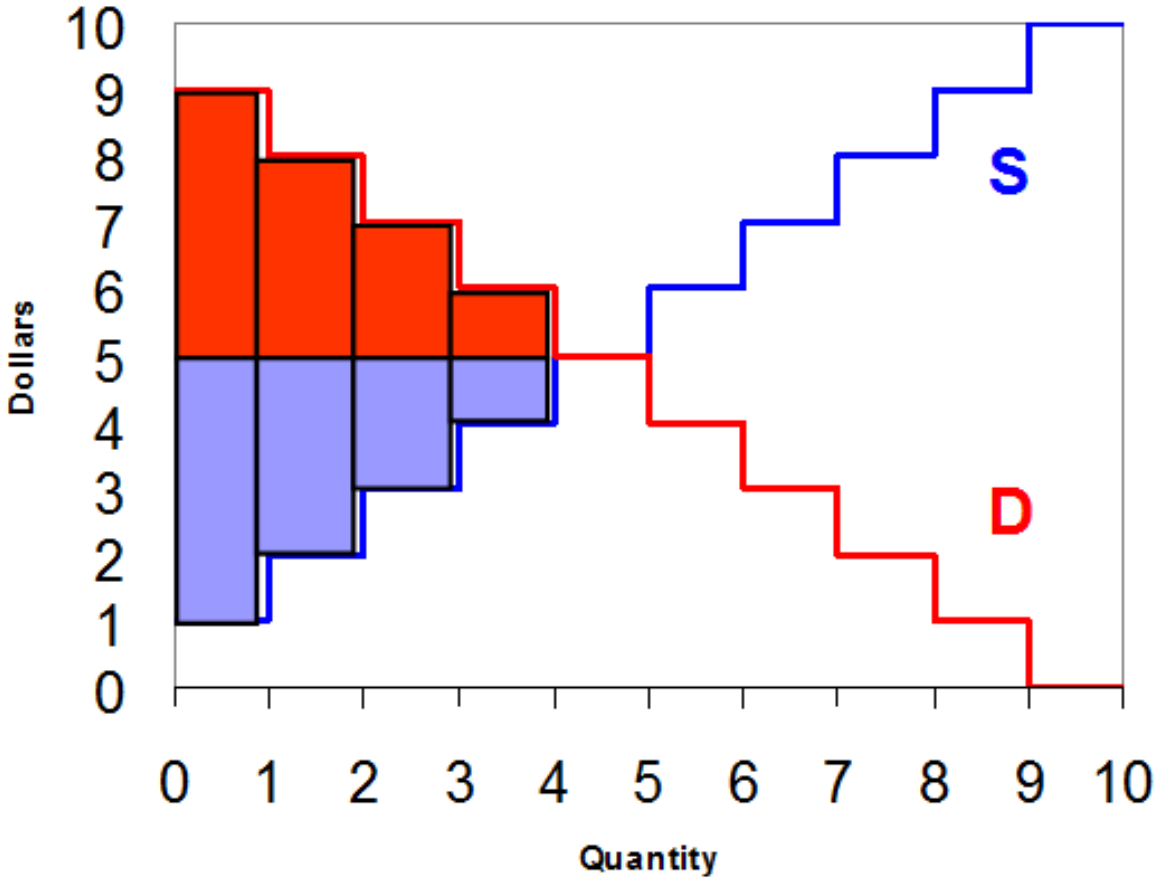
What is this allocation in EconLand?



$Q^{efficient} = 5$, Social Surplus equals:

8+6+4+2+0 = 20

The market allocation is pareto efficient



Q = 5, S1, S2, S3, S4, S5 produce,
D1, D2, D3, D4, D5 consume
Market Allocation is Pareto Efficient!

First Welfare Theorem

Assume
1. Market structure is perfectly competitive (not monopoly or oligopoly)

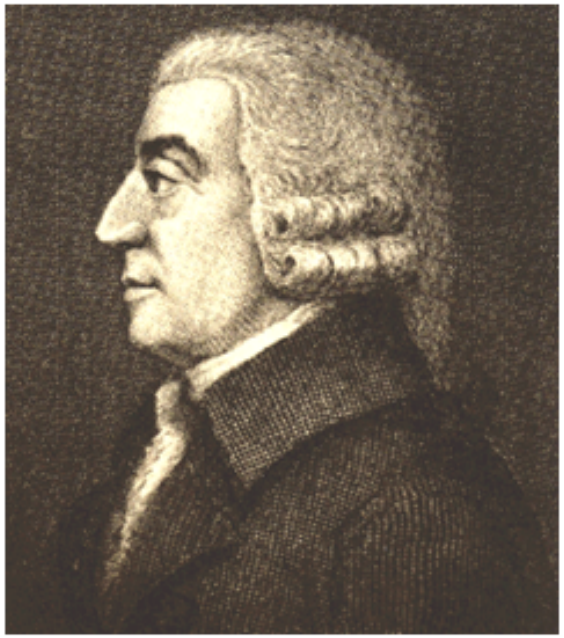
2. No externalities (my action hurts or benefits others, but I don't take into account. Like pollution.)

Then the unregulated market (laissezfaire) allocation is Pareto efficient. (It maximizes the size of the social pie.)

Adam Smith, Wealth of Nations, 1776

Also called "Adam Smith Theorem"

Remember quote about "invisible hand"



"Every individual... neither intends to promote the public interest, nor knows how much he is promoting it...(but)...by directing that industry (to) ...its ... greatest value, he is ...led by an **invisible hand** to promote an end which was no part of his intention."

Note on First Welfare Theorem

Note while the market maximizes the size of the pie (under the assumptions given above), you might not like the way it is divided up.

- Market delivers on efficiency.
- Not necessarily on equity.