TOPIC TWO
The Case for Free Trade

TOPIC TWO: KEY LEARNING OBJECTIVES

18. Differentiate an *absolute advantage* from a *comparative advantage*.

19. Identify who the seller should be in order for trade to be mutually advantageous. Identify who the buyer should be.

20. Specify the range in which the exchange rate (price) must be set for trade to be mutually advantageous. Explain when and why a price is too high or too low.

21. Use a two-product, two-producer model to demonstrate how trade can mitigate the problem of scarcity. Graph the gains from trade using a *production possibility curve* model.

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RESPONSES TO KEY LEARNING OBJECTIVES

18. Differentiate an *absolute advantage* from a *comparative advantage*.

A producer has an absolute advantage in the production of an economic good or service if the producer can supply the product at a lower resource cost than another producer. For instance, suppose there are two gardeners, Greenthumb (GT) and Fivethumbs (FT) who grow tomatoes (T) and corn (C). Greenthumb is the better gardener in both products, because she can produce a bushel of corn or a bushel of tomatoes using less labor than Fivethumbs. The following table summarizes the cost of corn and tomatoes in terms of hours of labor or resources:

Hours Per	GT	FT
1C	2H	6H
1T	3H	15H

Greenthumb has the absolute advantage in both corn and tomatoes, as she can supply these products at a lower cost in terms of resources (labor) than can Fivethumbs. It would seem, therefore, that she would have no reason to trade with Fivethumbs. It can be proven, however, that both producers improve their outcomes by trading along the lines of their respective comparative advantages.

Comparative Advantage

A producer has the comparative advantage in the production of a product if he or she can produce the good or service at a lower opportunity cost than another producer. The opportunity cost, in this case, is the value of output given up when a choice is made. When these two gardeners produce corn, they really give up tomatoes, not hours of labor. When they produce tomatoes, they really give up corn, not hours of labor.

Keep in mind that the true goal of planting a garden is not expending effort or labor to work up a sweat. The true goal of production is to supply something that is truly valuable to the consumer. Labor that does not result in valuable output is ultimately meaningless. In a world of scarcity, labor is but a means to a goal, and that goal is valuable output, in this case, corn and tomatoes. The opportunity costs for the two producers are summarized below:

Per Bushel	GT	FT
1C	0.67T	0.40T
1T	1.50C	2.50C

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When Greenthumb produces one bushel of corn, she gives up (cannot produce) 0.67 bushels of tomatoes. Hence, her opportunity cost in producing one unit of corn is 0.67 units of tomatoes. When Greenthumb produces one bushel of tomatoes, she gives up (cannot produce) 1.50 bushels of corn. Hence, her opportunity cost in producing one unit of tomatoes is 1.50 units of corn.

When Fivethumbs produces one bushel of corn, he gives up (cannot produce) 0.40 bushels of tomatoes. Hence, his opportunity cost in producing one unit of corn is 0.40 units of tomatoes. When Fivethumbs produces one bushel of tomatoes, he gives up (cannot produce) 2.50 bushels of corn. Hence, his opportunity cost in producing one unit of tomatoes is 2.50 units of corn. The transformation from resource cost to opportunity cost is shown below.

GT		**FT**	
1C=2H	1T=3H	1C=6H	1T=15H
1H=(1/2)C	1H=(1/3)T	1H=(1/6)C	1H=(1/15)T
(1/2)C=(1/3)T		(1/6)C=(1/15)T	
1C=(2/3)T	1T=(3/2)C	1C=(2/5)T	1T=(5/2)C
1.00C=0.67T	1.00T=1.50C	1.00C=0.40T	1.00T=2.50C

Greenthumb produces one unit of tomatoes (1.00T) at a lower opportunity cost (1.50C) than does Fivethumbs (2.50C). Hence, Greenthumb has the comparative advantage in tomatoes. Fivethumbs produces one unit of corn (1.00C) at a lower opportunity cost (0.40T) than does Greenthumb (0.67T). Hence, Fivethumbs has the comparative advantage in corn.

It can be seen from this example that a producer may have an absolute advantage in a product but not the comparative advantage in that product—Greenthumb and corn. A producer may have a comparative advantage in a product but not the absolute advantage in that product—Fivethumbs and corn. A producer may have an absolute and a comparative advantage in a given product—Greenthumb and tomatoes. A producer may have neither an absolute nor a comparative advantage in a product—Fivethumbs and tomatoes.

19. Identify who the seller should be in order for trade to be mutually advantageous. Identify who the buyer should be.

For trade to be mutually advantageous, the seller of an economic good or service should be the producer with the comparative advantage. The buyer of an economic good or service should be the producer with the comparative disadvantage. Remember that comparative advantage is determined on the basis of opportunity cost not resource cost.

With respect to tomatoes, Greenthumb should be the seller, and Fivethumbs should be the buyer. Greenthumb could benefit by selling a bushel of tomatoes to Fivethumbs for any amount of corn greater than 1.50 bushels of corn, since 1.50 bushels of corn is what she gets when she gives up a bushel of tomatoes in her own garden. Fivethumbs, on the other hand, would be better off if he could buy a bushel of tomatoes for any amount of corn less than 2.50 bushels of corn, since 2.50 bushels of corn is what he gives up to get one bushel of tomatoes in his own garden.

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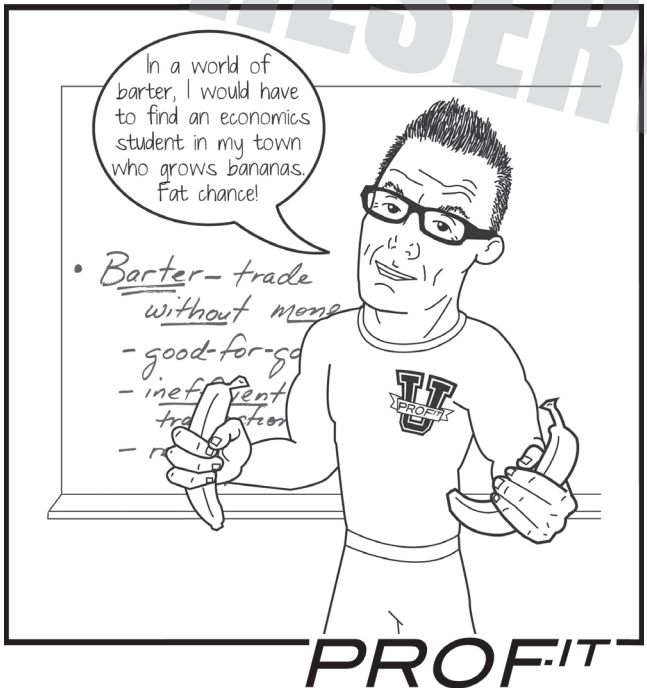
BARTER NO BANANAS



An exchange rate of 1.00T = 2.00C would benefit both parties. Greenthumb could make a bushel of tomatoes and trade it to Fivethumbs for 2.00 bushels of corn instead of giving up a bushel of tomatoes for 1.50 bushels of corn in her own garden. Fivethumbs could buy a bushel of tomatoes for 2.00 bushels corn instead of giving up 2.50 bushels of corn to get a bushel of tomatoes in his own garden.

Fivethumbs should be the seller of corn, and Greenthumb should be the buyer of corn. Fivethumbs could benefit by selling a bushel of corn to Greenthumb for any amount of tomatoes greater than 0.40 tomatoes, since Fivethumbs can get 0.40 units of tomatoes by giving up a bushel of corn in his own garden.

Remember that Fivethumbs, as the seller of corn, is actually trying to get rid of corn and to get tomatoes.

Greethumb, on the other hand, would be better off if she could buy a bushel of corn from Fivethumbs for any amount of tomatoes less than 0.67 units of tomatoes, since she gives up 0.67 units of tomatoes for every bushel of corn she produces. Remember that Greenthumb, as the buyer of corn, is actually trying to get corn and to get rid of tomatoes.

An exchange rate of 1.00C = 0.50T would benefit both parties. Fivethumbs could make a bushel of corn and trade it to Greenthumb for 0.50 bushels of tomatoes instead of giving up a bushel of corn for 0.40 bushels of tomatoes in his own garden. Greenthumb could buy a bushel of corn for 0.50 bushels tomatoes from Fivethumbs instead of giving up 0.67 bushels of tomatoes to get a bushel of corn in her own garden.

20. Specify the range in which the exchange rate (price) must be set for trade to be mutually advantageous. Explain when and why a price is too high or too low.

A mutually advantageous exchange rate must fall below the buyer's maximum price and above the seller's minimum price. In the tomato market, the maximum price could not exceed 2.50C, Fivethumbs' (the buyer's) maximum price. Nor could it fall below 1.50C, Greenthumb's (the seller's) minimum price. In the corn market, the maximum price could not exceed 0.67T, Greenthumb's (the buyer's) maximum price. Nor could it be below 0.40, Fivethumbs' (the seller's) minimum price.

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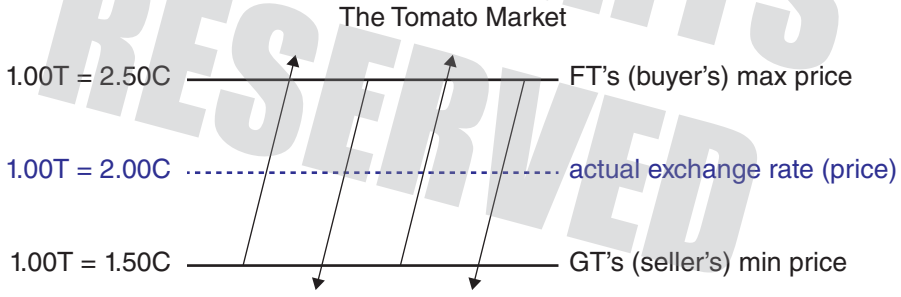
The effective trading zone for tomatoes is shown below:



The Tomato Market

This model shows that Greenthumb is happy to sell tomatoes for any price greater than 1.50C and that Fivethumbs is happy to buy tomatoes for any price less than 2.50C. The actual exchange rate (1.00T = 2.00C) splits the difference between the buyer's maximum price (1.00T = 2.50C) and the seller's minimum price (1.00T = 1.50C) and makes both parties equally "happy."

The actual exchange rate does not have to be the mid-point of the effective trading zone. An exchange rate of 1.00T = 2.25C would induce both parties to trade, but would benefit the seller of tomatoes (GT) more than the buyer of tomatoes (FT). An exchange rate of 1.00T = 1.75C would again induce both parties to trade, but would benefit the buyer of tomatoes (FT) more than the seller of tomatoes (GT).

An exchange rate of 1.00T = 0.75C would not induce trade, because the seller of tomatoes (GT) would not trade at that price. After all, why would she make a unit of tomatoes and trade it away for 0.75C, when she could enjoy 1.50C by simply "trading away" one unit of tomatoes in her own garden?

An exchange rate of 1.00T = 3.00C would not induce trade, because the buyer of tomatoes (FT) would not trade at that price. After all, why would he buy a unit of tomatoes for 3.00C, when he could produce a unit of tomatoes himself and give up only 2.50C in his own garden?

Where the actual exchange rate falls in the effective trading zone is dependent on the relative market power of the buyer(s) and seller(s) involved. In this case, Greenthumb, due to her absolute advantage in both products, might be able to negotiate an exchange rate for tomatoes that is relatively high in the zone, say 1.00T = 2.25C. Assuming she could, her gains from trade would exceed Fivethumbs' gains from trade. But do not forget that, any exchange rate within the trading zone improves the outcomes of both buyer and seller.

21. Use a two-product, two-producer model to demonstrate how trade can mitigate the problem of scarcity. Graph the gains from trade using a *production possibility curve* model.

The Greenthumb/Fivethumbs problem is a variation of a problem proposed by an economist named David Ricardo long ago. Ricardo sought to prove that trade could be mutually advantageous for two producers (countries) even if one of the producers were to have an absolute advantage in the production of both products. At the time, this was a revolutionary idea. To some, it still is.

To make Ricardo's point, the analysis is simplified considerably by assuming that Greenthumb and Fivethumbs have the same amount of resources. It is also assumed that each gardener's needs are expressed in terms of tomatoes, each gardener's needs could be met without trade, and the given exchange rate is within the trading zone.

The analysis flows in three major movements: (1) Resource costs are converted to opportunity costs. (2) No-trade outcomes are calculated. (3) Trade outcomes are calculated and compared with no-trade outcomes. Gains from trade are then determined.

No-trade Outcomes

Suppose that Greenthumb has 180 hours to devote to her garden with which she can produce 90 units of corn (180H/2H), 60 units of tomatoes (180H/3H), or some combination in between. Suppose that she needs 50 units of tomatoes. If she produces 50 units of tomatoes, she has enough time and garden to produce 15 units of corn.

This combination of tomatoes and corn presents one point on Greenthumb's production possibilities curve (PPC). A PPC is a line showing all combinations of two products that can be produced with a fixed amount of resources, in this case, 180 hours of labor. Remember, whenever Greenthumb produces one unit of tomatoes, she gives up 1.50 units of corn. So if she produces 50 units of tomatoes, she gives up 75 units of corn, leaving her with only 15 units of corn (90–75).

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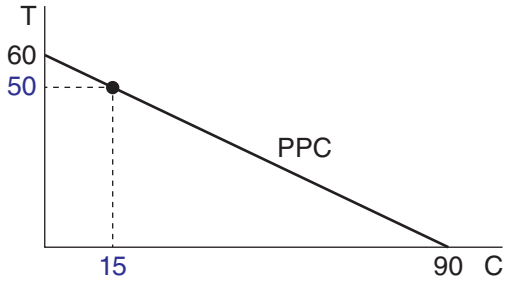
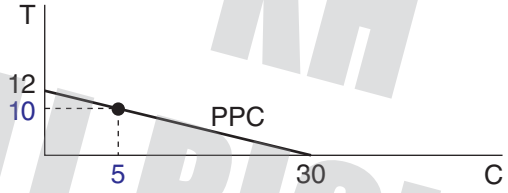
The PPC below illustrates these outcomes:



If Fivethumbs has 180 hours to devote to his garden, he can produce 30 units of corn (180H/6H), 12 units of tomatoes (180H/15H), or some combination in between. Suppose that he needs 10 units of tomatoes. If he produces 10 units of tomatoes, he has enough time and garden to produce 5 units of corn. These outcomes are illustrated on the PPC below:



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Again, a PPC is a line showing all the combinations of two products that can be produced with a fixed amount of resources, in this case, 180 hours of labor. Remember, whenever Fivethumbs produces one unit of tomatoes, he gives up 2.50 units of corn. So if he produces 10 units of tomatoes, she gives up 25 units of corn, leaving him with only 5 units of corn (30–25).

In comparing Fivethumbs' PPC with Greenthumb's PPC, it is clear that Fivethumbs is "poorer" than Greenthumb when it comes to the production of tomatoes and corn. Trade will not change that fact. But mutually advantageous trade can improve each producer's outcomes. The rich gardener (Greenthumb) will get richer by trading. The poor gardener (Fivethumbs) will also get richer by trading.

Trade Outcomes

Suppose that Greenthumb and Fivethumbs agree to trade at an exchange rate (price) of 1.00T = 2.00C. Greenthumb will specialize along the lines of her comparative advantage; therefore, she will produce all the tomatoes. Fivethumbs will specialize along the lines of his comparative advantage; therefore, he will produce all of the corn.

Greenthumb produces 60 units of tomatoes (180H/3H) from her garden. She keeps 50 units to meet her own personal demand. She trades the remaining 10 units of tomatoes to Fivethumbs to meet his need. Fivethumbs produces 30 units of corn (180H/6H) from his garden. He trades 20 units of corn away to Greenthumb to pay for the 10 units of tomatoes he purchases at 1.00T = 2.00C. He has 10 units of corn left for his own use.

By trading, both producers improve their outcomes. With trade, Greenthumb enjoys 50 units of tomatoes and 20 units of corn, an improvement of 5 units of corn. With trade, Fivethumbs enjoys 10 units of tomatoes and 10 units of corn, an improvement of 5 units of corn. Each producer has escaped the limits of "self-sufficiency" by cooperating with the other.

The following table summarizes each gardener's outcomes without and with trade:

	GT	FT
No Trade	50T/15C	10T/5C
Trade	50T/20C	10T/10C
Net Effect	+5C	+5C

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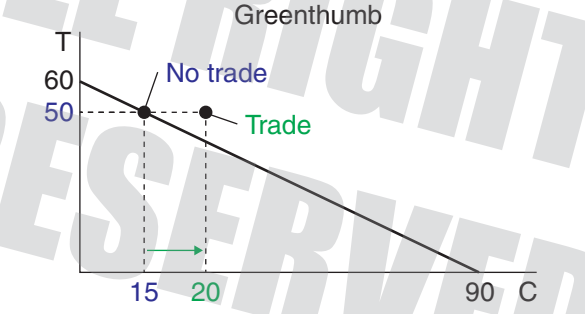
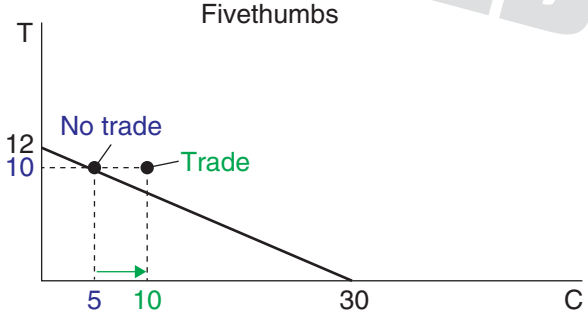
These trade outcomes are illustrated on the graphs below:





Both Greenthumb and Fivethumbs escape the boundaries of "self-sufficiency" by specializing and trading with one another. Self-sufficiency is the road to poverty, mutual dependency and cooperation is the road to greater prosperity. These principles apply to individual producers as well as to entire nations.

Note that the gain from trade is equally divided in this case, because the exchange rate (1.00T = 2.00C) is the midpoint between the seller's minimum price (1.00T = 1.50C) and the buyer's maximum price (1.00T = 2.50C). As proven earlier, any exchange rate between these two extremes would result in mutually advantageous trade. When the exchange rate is relatively high in the trading zone, the seller will benefit more than the buyer. When the exchange rate is relatively low in the trading zone, the buyer will benefit more than the seller.

SELF-ASSESSMENT: UNIT ONE, TOPIC TWO

1. Practice the Greenthumb/Fivethumbs problem.

The following table summarizes the cost in hours (H) of corn (C) and tomatoes (T) for Greenthumb (GT) and Fivethumbs (FT), two gardeners.

Hours	GT	FT
1C	2H	6H
1T	3H	15H

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a. Who has the absolute advantage in corn? In tomatoes?

_____

_____

b. Calculate the opportunity cost of corn and tomatoes for each gardener and complete the following table.

Per Bushel	GT	FT
1C	___T	___T
1T	___C	___C

c. Who has the comparative advantage in corn? In tomatoes?

_____

_____

d. The buyer of tomatoes is _____ who must pay *(less or more)* than _____ bushels of corn. The seller of tomatoes is _____ who must be paid *(less or more)* than _____ bushels of corn.

e. Assume that each gardener has 180 hours of labor to devote to gardening. Assume that Greenthumb needs fifty (50) bushels of tomatoes and that Fivethumbs needs ten (10) bushels of tomatoes. Assume that the exchange rate is 1.00T = 2.00C. Complete the following table and draw PPCs for the gardeners showing how trade affects their production outcomes.

	GT	**FT**
No Trade	___T/___C	___T/___C
Trade	___T/___C	___T/___C
Net Effect	+___C	+___C

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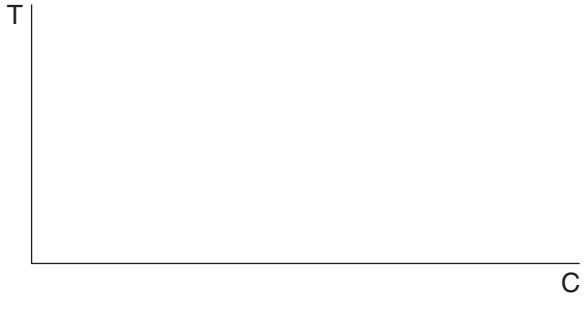
Greenthumb

Fivethumbs



2. The following table summarizes the cost in pounds (P) of resources used in the production of Good X and Good Z by Producer A and Producer B.

Pounds Per	**A**	**B**
1X	2P	6P
1Z	8P	12P

a. Who has the absolute advantage in Good X? In Good Z?

_____

_____

b. Calculate the opportunity cost of Good X and Good Z for each producer and complete the following table.

	A	**B**
1X	___Z	___Z
1Z	___X	___X

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c. Who has the comparative advantage in Good X? In Good Z?

_____

_____

d. The buyer of Good Z is _____ who must pay *(less or more)* than _____ units of Good X. The seller of Good Z is _____ who must be paid *(less or more)* than _____ units of Good X.

e. Each producer has 144 pounds of resources to devote to production. Assume that Producer A needs eight (8) units of Z and that Producer B needs four (4) units of Z. Assume that the exchange rate is 1.0Z = 3.5X. Complete the following table and draw PPCs for the producers showing how trade affects their production outcomes.

	A	B
No Trade	___Z/___X	___Z/___X
Trade	___Z/___X	___Z/___X
Net Effect	+___X	+___X

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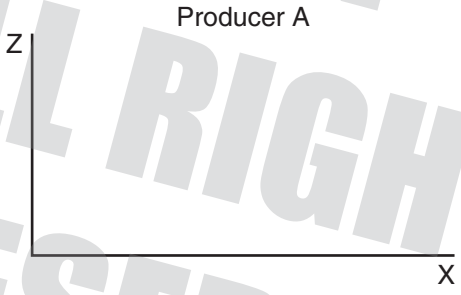

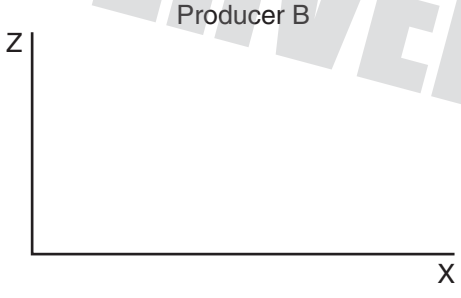

(Check your answers on page 101.)