entirely different good (berries from Crusoe). Similarly, if, because of feelings of friendship or hostility, receiving berries from Crusoe takes on a different quality from that of receiving berries from Jones, the two packets of berries are no longer of equal serviceability to Jackson, and therefore they become for him *two different goods.* If these feelings cause him to sell to Jones for 4,000 berries rather than to Crusoe for 5,000 berries, this does not mean that he chooses a lower price for the same good; he chooses between two different goods—berries from Crusoe and berries from Jones. Thus, at all times, an actor will sell his product at the highest possible price in terms of the good received.

Clearly, the converse is true for the buyer. *The buyer will always purchase his good at the lowest possible price.* This truth can be traced in the example just discussed, since, at the point that Jackson was a seller of the cow, he was also a *buyer of the berries.* Where the good in question—berries—was comparable, he bought at the lowest possible price—say $^{1}/_{5,000}$ cow per berry in preference to $^{1}/_{4,000}$ cow per berry. In cases where Jackson chooses the latter price, the two berries are no longer the same, but different, goods. If, to buy berries, the purchaser has to range further afield or buy from someone he dislikes, then this good becomes a different one in kind from the good closer by or sold by a friend.

5. Determination of Price: Equilibrium Price[22]

One of the most important problems in economic analysis is the question: What principles determine the formation of prices on the free market? What can be said by logical derivation from the fundamental assumption of human action in order to explain the determination of all prices in interpersonal exchanges, past, present, and future?

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[22]Cf. Böhm-Bawerk, *Positive Theory of Capital*, pp. 195–222. Also cf. Fetter, *Economic Principles*, pp. 42–72; and Menger, *Principles of Economics*, pp. 191–97.

It is most convenient to begin with a case of *isolated exchange*, a case where only two isolated parties are involved in the exchange of two goods. For example, Johnson and Smith are considering a possible exchange of a horse of the former for some barrels of fish possessed by the latter. The question is: What can economic analysis say about the determinants of the exchange rate established between the two goods in the exchange?

An individual will decide whether or not to make an exchange on the basis of the relative positions of the two goods on his value scale. Thus, suppose the value scale of Smith, the possessor of the fish, is as follows:

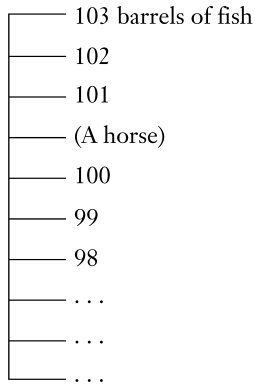

FIGURE 8. SMITH'S VALUE SCALE

(Any desired numbers of rank could be assigned to the various quantities, but these are not necessary here.)

It is clear that Smith would be willing to acquire a horse from Johnson if he could give up *100 barrels of fish or less*. One hundred barrels or less are less valuable to Smith than the horse. On the other hand, 101 or more barrels of fish are more valuable to him than the horse. Thus, if the *price* of the horse in terms of the fish offered by Smith is *100 barrels or less*, then Smith will make the exchange. If the price is 101 barrels or more, then the exchange will not be made.

Suppose Johnson's value scale looks like this:

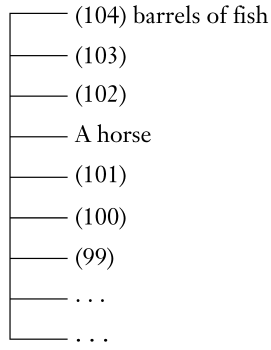

FIGURE 9. JOHNSON'S VALUE SCALE

Then, Johnson will not give up his horse for less than 102 barrels of fish. If the price offered for his horse is less than 102 barrels of fish, he will not make the exchange. Here, it is clear that *no exchange will be made*; for at Johnson's minimum selling price of 102 barrels of fish, it is more beneficial for Smith to keep the fish than to acquire the horse.

In order for an exchange to be made, then, the *minimum selling price of the seller must be lower than the maximum buying price of the buyer* for that good. In this case, it must be lower than the price of 100 barrels of fish per horse. Suppose that this condition is met, and Johnson's value scale is as follows:

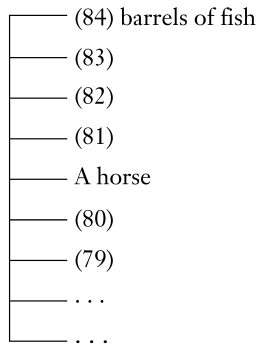

FIGURE 10. JOHNSON'S VALUE SCALE

Johnson will sell the horse for any amount of fish at or above 81 barrels. This, then, is his minimum selling price for the horse. With this as Johnson's value scale, and Smith's as pictured in Figure 8, what price will they agree upon for the horse (and, conversely, for the fish)? All analysis can say about this problem is that, since the exchange must be for the mutual benefit of both parties, *the price of the good in isolated exchange will be established somewhere between the maximum buying price and the minimum selling price*, i.e., the price of the horse will be somewhere between 100 barrels and 81 barrels of fish. (Similarly, the price of the fish will be set somewhere between 1/81 and 1/100 of a horse per barrel.) We cannot say at which point the price will be set. That depends on the data of each particular case, on the specific conditions prevailing. In particular, it will depend upon the *bargaining skill* of the two individuals. Clearly, Johnson will try to set the price of the horse as high as possible, while Smith will try to set the price as low as possible. This is based on the principle that the seller of the product tries to obtain the highest price, while the buyer tries to secure the lowest price. We cannot predict the point that the two will agree on, except that it will be somewhere in this range set by the two points.[23]

Now, let us gradually remove our assumption of isolated exchange. Let us first assume that Smith has a competitor, Brown, a rival in offering fish for the desired horse of Johnson's. We assume that the fish offered by Brown is of identical serviceability to Johnson as the fish offered by Smith. Suppose that Smith's value scale is the same as before, but that Brown's value scale is such that the horse is worth more than 90 barrels of fish to him, but less than 91 barrels. The value scales of the three individuals will then appear as is shown in Figure 11.

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[23]Of course, given other value scales, the final prices might be determinate at our point, or within a narrow range. Thus, if Smith's maximum buying price is 87, and Johnson's minimum selling price is 87, the price will be uniquely determined at 87.

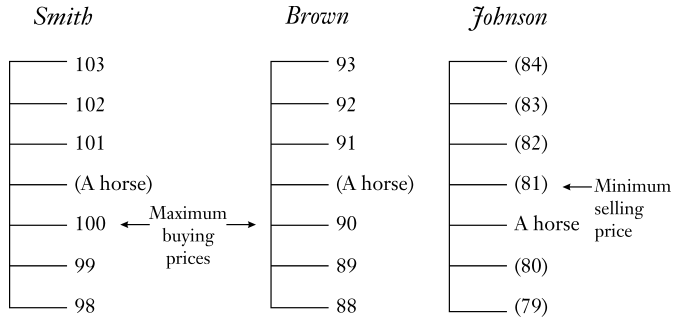

FIGURE 11. VALUE SCALES OF THREE INDIVIDUALS

Brown and Smith are competing for the purchase of Johnson's horse. Clearly, only one of them can make the exchange for the horse, and since their goods are identical to Johnson, the latter's decision to exchange will be decided by the price offered for the horse. Obviously, Johnson will make the exchange with that potential buyer who will offer the highest price. Their value scales are such that Smith and Brown can continue to overbid each other as long as the price range is between 81 and 90 barrels of fish per horse. Thus, if Smith offers Johnson an exchange at 82 barrels per horse, Brown can compete by raising the bid to 84 barrels of fish per horse, etc. This can continue, however, only until Brown's maximum buying price has been exceeded. If Smith offers 91 barrels for the horse, it no longer pays for Brown to make the exchange, and he drops out of the competition. Thus, the price in the exchange will be high enough to exclude the "less capable" or "less urgent" buyer—the one whose value scale does not permit him to offer as high a price as the other, "more capable," buyer. We do not know exactly what the price will be, but we do know that it will be set by bargaining *somewhere at or below the maximum buying price of the most capable buyer and above the maximum buying price of the next most capable buyer.* It will be somewhere between 100 barrels and 91 barrels, and the exchange will be made with Smith. We see that the addition of another competing buyer for the product considerably narrows the zone of bargaining in determining the price that will be set.

This analysis can easily be extended to a case of one seller and *n* number of buyers (each offering the same commodity in exchange). Thus, suppose that there are five potential buyers for the horse, all offering fish, whose value scales are as follows:

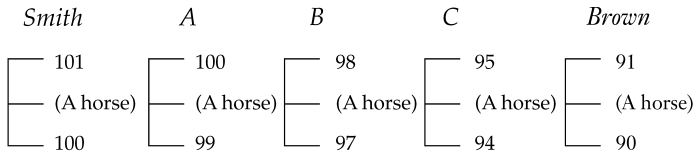

FIGURE 12. VALUE SCALES OF FIVE POTENTIAL PURCHASERS

With only one horse to be disposed of to one buyer, the buyers overbid each other until each must drop out of the competition. Finally, Smith can outbid A, his next most capable competitor, only with a price of 100. We see that in this case, the price in the exchange is uniquely determined—once the various value scales are given—at 100, since at a lower price A is still in the bidding, and, at a higher price, no buyer will be willing to conclude the exchange. At any rate, even if the value scales are not such as to determine the price uniquely, the addition of more competitors greatly narrows the bargaining zone. The general rule still holds: The price will be between the maximum buying price of the most capable and that of the next most capable competitor, including the former and excluding the latter.[24]

It is also evident that the narrowing of the bargaining zone has taken place in an upward direction, and to the advantage of the seller of the product.

The case of one-sided competition of *many sellers with just one buyer* is the direct converse of the above and may be considered by merely reversing the example and considering the price of the fish instead of the price of the horse. As more sellers of the

[24]Auction sales are examples of markets for one unit of a good with one seller and many buyers. Cf. Boulding, *Economic Analysis*, pp. 41–43.

fish competed to conclude the exchange with the one buyer, the zone of determination of the price of fish narrowed, although this time in a downward direction and to the further advantage of the buyer. As more sellers were added, each tried to *underbid* his rival—to offer a lower price for the product than his competitors. The sellers continued to underbid each other until all but the one seller were excluded from the market. In a case of many sellers and one buyer, the price will be set at a *point between the minimum selling price of the second most capable and that of the most capable competitor*—strictly, at a point below the former and down to or including the latter. In the final example above, the point was pushed down to be uniquely determined at the latter point—1/100 horse per barrel.

We have so far considered the cases of one buyer and more than one seller, and of one seller and more than one buyer. We now come to the only case with great importance in a modern, complex economy based on an intricate network of exchanges: *two-sided competition of buyers and sellers.* Let us therefore consider a market with any number of competing buyers and sellers. Any product could be considered, but our hypothetical example will continue to be the sale of horses in exchange for fish (with the horses as well as the fish considered by all parties as homogeneous units of the same good). The following is a list of the maximum buying prices of the various buyers, based on the valuations on their respective value scales:

Buyers of Horses	*Maximum Buying Price*
X1	100 barrels of fish
X2	98
X3	95
X4	91
X5	89
X6	88
X7	86
X8	85
X9	83

The following is a list of the minimum selling prices of the various sellers on the market:

Sellers of Horses	*Minimum Selling Prices*
Z1	81 barrels of fish
Z2	83
Z3	85
Z4	88
Z5	89
Z6	90
Z7	92
Z8	96

The "most capable buyer" of horses we recognize as Smith, with a buying price of 100 barrels. Johnson is the "most capable seller"— the seller with the lowest minimum selling price—at 81 barrels. The problem is to find the principle by which the price, or prices, of the exchanges of horses will be determined.

Now, let us first take the case of X1—Smith. It is clear that it is to the advantage of Smith to make the exchange at a price of 100 barrels for the horse. Yet it is to Smith's greater advantage to buy the good at the lowest possible price. He is not engaged in overbidding his competitors merely for the sake of overbidding. He will try to obtain the good for the lowest price that he can. Therefore, Smith will prefer to begin bidding for a horse at the lowest prices offered by his competitors, and only raise the offered price if it becomes necessary to do so in order to avoid being shut out of the market. Similarly, Johnson would make an advantageous sale at a price of 81 barrels. However, he is interested in selling his product at the highest possible price. He will underbid his competitor only if it becomes necessary to do so in order to avoid being shut out of the market without making a sale.

It is evident that buyers will tend to start negotiations by offering as low prices as possible, while sellers will tend to start by asking for as high a price as they think they can obtain. Clearly, this

preliminary "testing of the market" will tend to be more prolonged in a "new" market, where conditions are unfamiliar, while it will tend to be less prolonged in an "old" market, where the participants are relatively familiar with the results of the price-formation process in the past and can estimate more closely what the results will be.

Let us suppose that buyers begin by offering the low price of 82 barrels for a horse. Here is a price at which each of the buyers would be glad to make a purchase, but only one seller, Z1, would be willing to sell at 82. It is possible that Z1, through ignorance, might conclude the exchange with some one of the buyers at 82, without realizing that he could have obtained a higher price. It is also possible that the other buyers will, through ignorance, permit the buyer to get away with this windfall without overbidding him for this cheap horse. But such a result is not very likely. It seems most likely that Z1 will not sell at such a low price, and that the buyers would immediately overbid any attempt by one of their number to conclude an exchange at that price. Even if, by some chance, one exchange was concluded at 82, it is obvious that such a price could not last. Since no other seller would make an exchange at that price, the price of further exchanges would have to rise further, as a result of upbidding by buyers.

Let us assume at this point that no exchange will be made at this price because of the further upbidding of the buyers and the knowledge of this by the sellers. As the offering price rises, the least capable buyers, as in the previous case, begin to be excluded from the market. A price of 84 will bring two sellers into the market, but will exclude X9 from the buyer's side. As the offering price rises, the disproportion between the *amount offered for sale* and the *amount demanded for purchase* at the given price diminishes, but as long as the latter is greater than the former, mutual overbidding of buyers will continue to raise the price. The amount offered for sale at each price is called the *supply*; the amount demanded for purchase at each price is called

the *demand*. Evidently, at the first price of 82, the supply of horses on the market is one; the demand for horses on the market is nine. Only one seller would be willing to sell at this price, while all nine buyers would be willing to make their purchase. On the basis of the above tabulations of maximum buying prices and minimum selling prices, we are able to present a list of the quantities of the good that will be demanded and supplied at each hypothetical price.

TABLE 2

PRICE	SUPPLIED	DEMANDED	PRICE	SUPPLIED	DEMANDED
80	0 horses	9 horses	91	6 horses	4 horses
81	1	9	92	7	3
82	1	9	93	7	3
83	2	9	94	7	3
84	2	8	95	7	3
85	3	8	96	8	2
86	3	7	97	8	2
87	3	6	98	8	2
88	4	6	99	8	1
89	5	5	100	8	1
90	6	4	101	8	0

This table reflects the progressive entry into the market of the sellers as the price increases and the dropping out of the buyers as the price increases. As was seen above, as long as the demand exceeds the supply at any price, buyers will continue to overbid and the price will continue to rise.

The converse occurs if the price begins near its highest point. Thus, if sellers first demand a price of 101 barrels for the horse, there will be eight eager sellers and no buyers. At a price of 99 the sellers may find one eager buyer, but chances are that a sale will not be made. The buyer will realize that there is no point in paying such a high price, and the other sellers will

eagerly underbid the one who tries to make the sale at the price of 99. Thus, when the price is so high that the *supply exceeds the demand* at that price, underbidding of suppliers will drive the price downward. As the tentative price falls, more sellers are excluded from the market, and more buyers enter it.

If the overbidding of buyers will drive the price up whenever the quantity demanded is greater than the quantity supplied, and the underbidding of sellers drives the price down whenever supply is greater than demand, it is evident that the price of the good will find a resting point where the quantity demanded is equal to the quantity supplied, i.e., where supply equals demand. At this price and at this price only, *the market is cleared*, i.e., there is no incentive for buyers to bid prices up further or for sellers to bid prices down. In our example, this final, or *equilibrium price*, is 89, and at this price, five horses will be sold to five buyers. This equilibrium price is the price at which the good will tend to be set and sales to be made.[25]

Specifically, the sales will be made to the five most capable buyers at that price: X1, X2, X3, X4, and X5. The other less-capable (or less urgent) buyers are excluded from the market, because their value scales do not permit them to buy horses at

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[25]It is possible that the equilibrium point will not be uniquely determined at one definite price. Thus, the pattern of supply and demand schedules might be as follows:

P	*S*	*D*
89	5	6
90	6	5

The inequality is the narrowest possible, but there is no one point of equality. In that case, if the units are further divisible, then the price will be set to clear the market at a point in between, say 89.5 barrels of fish per horse. If both goods being exchanged are indivisible further, however, such as cows against horses, then the equilibrium price will be either 89 or 90, and this will be the closest approach to equilibrium rather than equilibrium itself.

that price. Similarly, sellers Z1–Z5 are the ones that make the sale at 89; the other sellers are excluded from the market, because their value scales do not permit them to be in the market at that price.

In this horse-and-fish market, Z5 is the least capable of the sellers who have been able to stay in the market. Z5, whose minimum selling price is 89, is just able to make his sale at 89. He is the *marginal seller*—the seller at the margin, the one who would be excluded with a slight fall in price. On the other hand, X5 is the least capable of the buyers who have been able to stay in the market. He is the *marginal buyer*—the one who would be excluded by a slight rise in price. Since it would be foolish for the other buyers to pay more than they must to obtain their supply, they will also pay the same price as the marginal buyer, i.e., 89. Similarly, the other sellers will not sell for less than they could obtain; they will sell at the price permitting the marginal seller to stay in the market.

Evidently, the more capable or "more urgent," buyers (and sellers)—the *supramarginal* (which includes the marginal)—obtain a psychic surplus in this exchange, for they are better off than they would have been if the price had been higher (or lower). However, since goods can be ranked only on each individual's value scale, and no *measurement* of psychic gain can be made either for one individual or between different individuals, little of value can be said about this psychic gain except that it exists. (We cannot even make the statement, for example, that the psychic gain in exchange obtained by X1 is greater than that of X5.) The excluded buyers and sellers are termed *submarginal*.

The specific feature of the "clearing of the market" performed by the equilibrium price is that, at this price alone, all those buyers and sellers who are willing to make exchanges can do so. At this price five sellers with horses find five buyers for the horses; all who wish to buy and sell at this price can do so. At any other price, there are either frustrated buyers or frustrated sellers. Thus, at a price of 84, eight people would like to buy at this price, but only two horses are available. At this price,

there is a great amount of "unsatisfied demand" or *excess demand*. Conversely, at a price of, say, 95, there are seven sellers eager to supply horses, but only three people willing to demand horses. Thus, at this price, there is "unsatisfied supply," or *excess supply*. Other terms for excess demand and excess supply are "shortage" and "surplus" of the good. Aside from the universal fact of the scarcity of all goods, a price that is below the equilibrium price creates an additional shortage of supply for demanders, while a price above equilibrium creates a surplus of goods for sale as compared to demands for purchase. We see that the market process always tends to eliminate such shortages and surpluses and establish a price where demanders can find a supply, and suppliers a demand.

It is important to realize that this process of overbidding of buyers and underbidding of sellers always takes place in the market, even if the surface aspects of the specific case make it appear that only the sellers (or buyers) are setting the price. Thus, a good might be sold in retail shops, with prices simply "quoted" by the individual seller. But the same process of bidding goes on in such a market as in any other. If the sellers set their prices below the equilibrium price, buyers will rush to make their purchases, and the sellers will find that shortages develop, accompanied by queues of buyers eager to purchase goods that are unavailable. Realizing that they could obtain higher prices for their goods, the sellers raise their quoted prices accordingly. On the other hand, if they set their prices above the equilibrium price, surpluses of unsold stocks will appear, and they will have to lower their prices in order to "move" their accumulation of unwanted stocks and to clear the market.

The case where buyers quote prices and therefore appear to set them is similar. If the buyers quote prices below the equilibrium price, they will find that they cannot satisfy all their demands at that price. As a result, they will have to raise their quoted prices. On the other hand, if the buyers set the prices too high, they will find a stampede of sellers with unsalable

stocks and will take advantage of the opportunity to lower the price and clear the market. Thus, regardless of the *form* of the market, the result of the market process is always to tend toward the establishment of the equilibrium price via the mutual bidding of buyers and sellers.

It is evident that, if we eliminate the assumption that no preliminary sales were made before the equilibrium price was established, this does not change the results of the analysis. Even if, through ignorance and error, a sale was made at a price of 81 or 99, these prices still will be ephemeral and temporary, and the final price for the good will tend to be the equilibrium price.

Once the market price is established, *it is clear that one price must rule over the entire market.* This has already been implied by the fact that all buyers and sellers will tend to exchange at the same price as their marginal competitors. There will always be a tendency on the market to establish one and only one price at any time for a good. Thus, suppose that the market price has been established at 89, and that one crafty seller tries to induce a buyer to buy at 92. It is evident that no buyer will buy at 92 when he knows that he can buy on the regular market at 89. Similarly, no seller will be willing to sell at a price below the market if he knows that he can readily make his sale at 89. If for example, an ignorant seller sells a horse at 87, the buyer is likely to enter the market as a seller to sell the horse at 89. Such drives for *arbitrage gains* (buying and selling to take advantage of discrepancies in the price of a good) act quickly to establish one price for one good over the entire market. Such market prices will tend to change only when changing supply and demand conditions alter the equilibrium price and establish a condition of excess supply or excess demand where before the market had been cleared.

A clearer picture of equilibrium prices as determined by supply and demand conditions will be derived from the graphical representation in Figure 13.

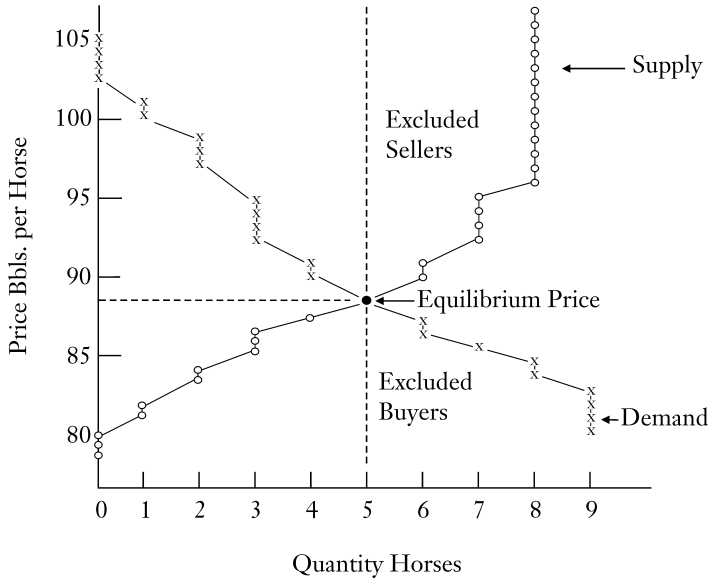


FIGURE 13. DETERMINATION OF EQUILIBRIUM PRICE

It is evident that, as the price increases, new suppliers with higher minimum selling prices are brought into the market, while demanders with low maximum buying prices will begin to drop out. Therefore, as the price decreases, the quantity demanded must always either remain the same or increase, never decrease. Similarly, as the price decreases, the amount offered in supply must always decrease or remain the same, never increase. Therefore, the demand curve must always be vertical or rightward-sloping as the price decreases, while the supply curve must always be vertical or leftward-sloping as the price decreases. The curves will intersect at the equilibrium price, where supply and demand are equal.

Clearly, once the zone of intersection of the supply and demand curves has been determined, it is the buyers and sellers at the margin—in the area of the equilibrium point—that determine what the equilibrium price and the quantity exchanged will be.

The tabulation of supply offered at any given price is known as the *supply schedule*, while its graphical presentation, with the points connected here for the sake of clarity, is known as the *supply curve*. Similarly, the tabulation of demand is the *demand schedule*, and its graphical representation the *demand curve*, for each product and market. Given the point of intersection, the demand and supply curves above and below that point could take many conceivable shapes without affecting the equilibrium price. The direct determinants of the price are therefore the marginal buyers and sellers, while the valuations of the supra-marginal people are important in determining *which* buyers and sellers will be at the margin. The valuations of the *excluded buyers and sellers* far beyond the margin have no direct influence on the price and will become important only if a change in the market demand and supply schedules brings them near the intersection point.

Thus, given the intersection point, the pattern of supply and demand curves (represented by the solid and dotted lines) could be at least any one of the variants shown in Figure 14.

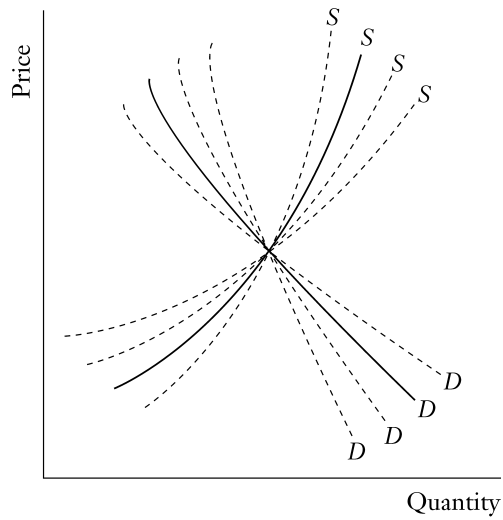


FIGURE 14. POSSIBLE PATTERNS

Up to this point we have assumed, for the sake of simplicity and clarity, that each demander, as well as each supplier, was limited to one unit of the good the price of which we have been concentrating on—the horse. Now we can remove this restriction and complete our analysis of the real world of exchange by permitting suppliers and demanders to exchange any number of horses that they may desire. It will be seen immediately that the removal of our implicit restriction makes no substantial change in the analysis. Thus, let us revert to the case of Johnson, whose minimum selling price for a horse was 81 barrels of fish. Let us now assume that Johnson has a stock of several horses. He is willing to sell one horse—the first—for a minimum price of 81 barrels, since on his value scale, he places the horse between 81 and 80 barrels of fish. What will be Johnson's minimum selling price to part with his second horse? We have seen earlier in this chapter that, according to the law of marginal utility, as a man's stock of goods declines, the value placed on each unit remaining increases; conversely, as a man's stock of goods increases, the marginal utility of each unit declines. Therefore, the marginal utility of the second horse (or, strictly, of each horse after the first horse is gone), will be greater than the marginal utility of the first horse. This will be true even though each horse is capable of the same service as every other. Similarly, the value of parting with a third horse will be still greater. On the other hand, while the marginal utility placed on each horse given up increases, the marginal utility of the additional fish acquired in exchange will decline. The result of these two factors is inevitably to raise the minimum selling price for each successive horse sold. Thus, suppose the minimum selling price for the first horse is 81 barrels of fish. When it comes to the second exchange, the value forgone of the second horse will be greater, and the value of the same barrels in exchange will decline. As a result, the minimum selling price below which Johnson will not sell the horse will increase, say, to 88. Thus, as the seller's stock dwindles, his minimum selling price increases. Johnson's value scale may appear as in Figure 15.

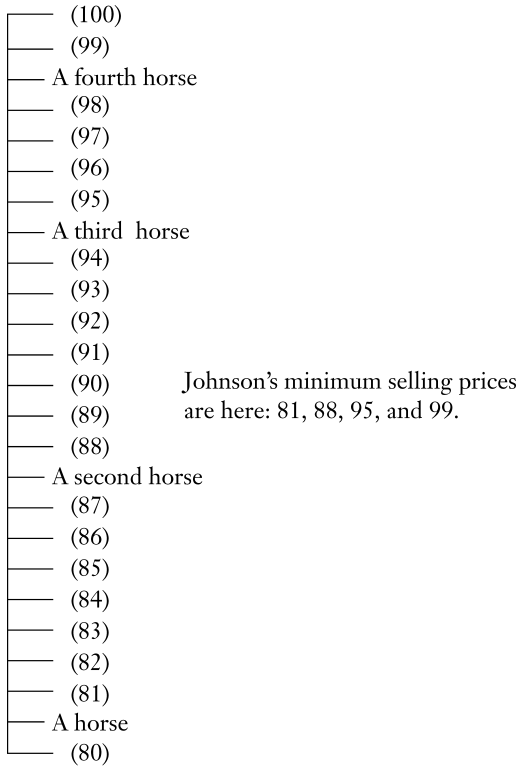


FIGURE 15. JOHNSON'S VALUE SCALE

On the basis of this value scale, Johnson's own individual supply schedule can be constructed. He will supply zero horses up to a price of 80, one horse at a price between 81 and 87, two horses with the price between 88 and 94, three horses at a price of 95 to 98, and four horses at a price of 99 and above. The same can be done for each seller in the market. (Where the seller has only one horse to sell, the supply schedule is constructed as before.) It is clear that a market-supply schedule can be constructed simply by adding the supplies that will be offered by the various individual sellers in the market at any given price.

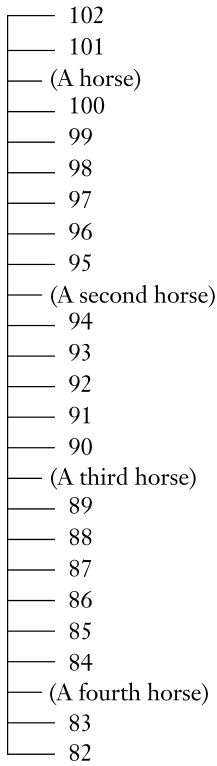
The essentials of the foregoing analysis of market supply remain unchanged. Thus, the effect of constructing the market-supply schedule in this case *is the same as if there were four sellers*,

each supplying one horse, and each with minimum selling prices of 81, 88, 95, and 99. The fact that it is one man that is supplying the new units rather than different men does not change the results of the analysis. What it does is to reinforce the rule that the supply curve must always be vertical or rightward-sloping as the price increases, i.e., *that the supply must always remain unchanged or increase with an increase in price.* For, in addition to the fact that new suppliers will be brought into the market with an increase in price, the same supplier will offer more units of the good. Thus, the operation of the law of marginal utility serves to reinforce the rule that the supply cannot decrease at higher prices, but must increase or remain the same.

The exact converse occurs in the case of demand. Suppose that we allow buyers to purchase any desired number of horses. We remember that Smith's maximum buying price for the first horse was 100 barrels of fish. If he considers buying a second horse, the marginal utility of the additional horse will be less than the utility of the first one, and the marginal utility of the same amount of fish that he would have to give up will increase. If the marginal utility of the purchases declines as more are made, and the marginal utility of the good given up increases, these factors result in lower maximum buying prices for each successive horse bought. Thus, Smith's value scale might appear as in Figure 16.

Such individual demand schedules can be made for each buyer on the market, and they can be added to form a resultant demand curve for all buyers on the market.

It is evident that, here again, there is no change in the essence of the market-demand curve. Smith's individual demand curve, with maximum buying prices as above, is analytically equivalent to four buyers with maximum buying prices of 83, 89, 94, and 100, respectively. The effect of allowing more than one unit to be demanded by each buyer brings in the law of marginal utility to reinforce the aforementioned rule that the demand curve is rightward-sloping as the price decreases, i.e., that *the demand must either increase or remain unchanged as the*



On this basis, an individual demand schedule for Smith can be constructed. Smith will demand: 4 horses at a price of 83 and below; 3 horses at a price of 84 to 89; 2 horses at a price of 90 to 94; 1 horse at a price of 95 to 100; and 0 horses at a price of 101 or over.

FIGURE 16. SMITH'S VALUE SCALE

price decreases. For, added to the fact that lower prices bring in previously excluded buyers, each individual will tend to demand more as the price declines, since the maximum buying prices will be lower with the purchase of more units, in accordance with the law of marginal utility.

Let us now sum up the factors determining prices in interpersonal exchange. One price will tend to be established for each good on the market, and that price will tend to be the equilibrium price, determined by the intersection of the market supply and demand schedules. Those making the exchanges at this price will be the supramarginal and marginal buyers and sellers, while the less capable, or submarginal, will be excluded from the sale, because their value scales do not permit them to

make an exchange. Their maximum buying prices are too low, or their minimum selling prices too high. The market supply and demand schedules are themselves determined by the minimum selling prices and maximum buying prices of all the individuals in the market. The latter, in turn, are determined by the placing of the units to be bought and sold on the individuals' value scales, these rankings being influenced by the law of marginal utility.

In addition to the law of marginal utility, there is another factor influencing the rankings on each individual's value scale. It is obvious that the amount that Johnson will supply at any price is limited by the *stock* of goods that he has available. Thus, Johnson may be willing to supply a fourth horse at a price of 99, but if this exhausts his available stock of horses, no higher price will be able to call forth a larger supply from Johnson. At least this is true as long as Johnson has no further stock available to sell. Thus, at any given time, the total stock of the good available puts a maximum limit on the amount of the good that can be supplied in the market. Conversely, the total stock of the purchasing good will put a maximum limit on the total of the sale good that any one individual, or the market, can demand.

At the same time that the market supply and demand schedules are setting the equilibrium price, they are *also* clearly setting the equilibrium *quantity* of both goods that will be exchanged. In our previous example, the equilibrium quantities exchanged are five horses, and 5 x 89, or 445 barrels of fish, for the aggregate of the market.

6. Elasticity of Demand[26]

The demand schedule tells us how many units of the purchase good will be bought at each hypothetical price. From this schedule we may easily find the *total number of units of the sale good that will be expended at each price.* Thus, from Table 2, we find that at

[26]Cf. Benham, *Economics*, pp. 60–63.

a price of 95, three horses will be demanded. If three horses are demanded at a price of 95 barrels of fish, then the total number of units of the sale good that will be offered in exchange will be 3 x 95, or 285 barrels of fish. This, then, is the *total outlay* of the sale good that will be offered on the market at that price.

The total outlay of the sale good at each hypothetical price is shown in Table 3.

TABLE 3

	BUYERS	
PRICE	DEMANDED	TOTAL OUTLAY SALE GOOD
80	9 horses	720 barrels of fish
81	9	729
82	9	738
83	9	747
84	8	672
85	8	680
86.	7	602
87	6	522
88	6	528
89	5	445
90	4	360
91	4	364
92	3	276
93	3	279
94	3	282
95	3	285
96	2	192
97	2	194
98	2	196
99	1	99
100	1	100
101	0	0

Figure 17 is a graphic presentation of the total outlay curve. It is evident that this is a logical derivation from the demand curve and that therefore it too is a curve of outlay by buyers at each hypothetical price.

A striking feature of the total outlay curve is that, in contrast to the other curves (such as the demand curve), it can slope in either direction as the price increases or decreases. The possibility of a slope in either direction stems from the operation of the two factors determining the position of the curve. Outlay = Price x Quantity Demanded (of purchase good). But we know that as the price decreases, the demand must either increase or remain the same. Therefore, a decrease in price tends to be counteracted by an increase in quantity, and, as a result, the total outlay of the sale good may either increase or decrease as the price changes.

For any two prices, we may compare the total outlay of the sale good that will be expended by buyers. If the lower price yields a greater total outlay than the higher price, the total outlay curve is defined as being *elastic* over that range. If the lower

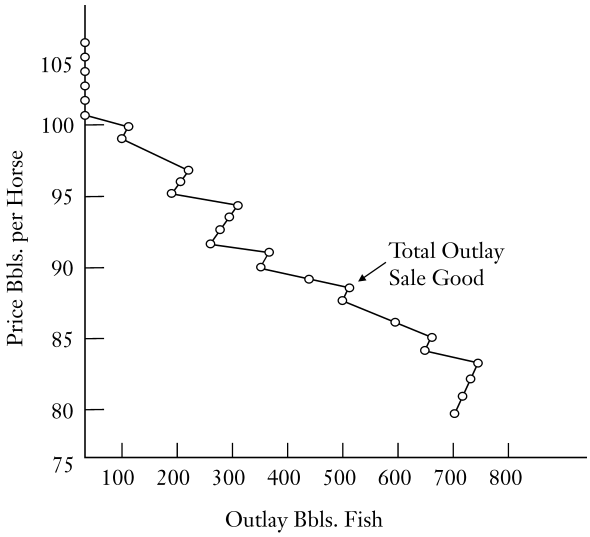


FIGURE 17. TOTAL OUTLAY CURVE

price yields a lower total outlay than the higher price, then the curve is *inelastic* over that range. Alternatively, we may say that the former case is that of an *elasticity greater than unity*, the latter of an *elasticity less than unity*, and the case where the total outlay is the same for the two prices is one of *unit elasticity*, or elasticity equal to one. Since numerical precision in the concept of elasticity is not important, we may simply use the terms "inelastic," "elastic," and (for the last case) "neutral."

Some examples will clarify these concepts. Thus, suppose that we examine the total outlay schedule at prices of 96 and 95. At 96, the total outlay is 192 barrels; at 95, it is 285 barrels. The outlay is greater at the lower price, and hence the outlay schedule is *elastic* in this range. On the other hand, let us take the prices 95 and 94. At 94, the outlay is 282. Consequently, the schedule here is *inelastic*. It is evident that there is a simple geometrical device for deciding whether or not the demand curve is elastic or inelastic between two hypothetical prices: if the outlay curve is further to the right at the lower price, the demand curve is elastic; if further to the left, the latter is inelastic.

There is no reason why the concept of elasticity must be confined to two prices next to each other. Any two prices on the schedule may be compared. It is evident that an examination of the entire outlay curve demonstrates that the foregoing demand curve is basically elastic. It is elastic over most of its range, with the exception of a few small gaps. If we compare any two rather widely spaced prices, it is evident that the outlay is less at the higher price. If the price is high enough, the demand for any good will dwindle to zero, and therefore the outlay will dwindle to zero.

Of particular interest is the elasticity of the demand curve at the equilibrium price. Going up a step to the price of 90, the curve is clearly elastic—total outlay is less at the higher price. Going down a step to 88, the curve is also elastic. This particular demand curve is elastic in the neighborhood of the equilibrium price. Other demand curves, of course, could possibly be inelastic at their equilibrium price.

Contrary to what might be thought at first, the concept of "elasticity of supply" is not a meaningful one, as is "elasticity of demand." If we multiply the quantity supplied at each price by the price, we obtain the number of barrels of fish (the sale good) which the sellers will demand in exchange. It will easily be seen, however, that this quantity *always increases* as the price increases, and *vice versa*. At 82 it is 82, at 84 it is 168, at 88 it is 352, etc. The reason is that its other determinant, quantity supplied, changes in the *same* direction as the price, not in the inverse direction as does quantity demanded. As a result, supply is always "elastic," and the concept is an uninteresting one.[27]

7. *Speculation and Supply and Demand Schedules*

We have seen that market price is, in the final analysis, determined by the intersection of the supply and demand schedules. It is now in order to consider further the determinants of these particular schedules. Can we establish any other conclusions concerning the causes of the shape and position of the supply and demand schedules themselves?

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[27]The attention of some writers to the elasticity of supply stems from an erroneous approach to the entire analysis of utility, supply, and demand. They assume that it is possible to treat human action in terms of "infinitely small" differences, and therefore to apply the mathematically elegant concepts of the calculus, etc., to economic problems. Such a treatment is fallacious and misleading, however, since human action must treat all matters only in terms of discrete steps. If, for example, the utility of X is so little smaller than the utility of Y that it can be regarded as identical or negligibly different, then human action will treat them as such, i.e., as the same good. Because it is conceptually impossible to measure utility, even the drawing of continuous utility curves is pernicious. In the supply and demand schedules, it is not harmful to draw continuous curves for the sake of clarity, but the mathematical concepts of continuity and the calculus are not applicable. As a result, the seemingly precise concept of "elasticity at a point" (percentage increase in demand divided by a "negligibly small" percentage decrease in price) is completely out of order. It is this mistaken substitution of mathematical elegance for the realities of human action that lends a seeming importance to the concept of "elasticity of supply," comparable to the concept of elasticity of demand.

We remember that, at any given price, the amount of a good that an individual will buy or sell is determined by the position of the sale good and the purchase good on his value scale. He will demand a good if the marginal utility of adding a unit of the purchase good is greater than the marginal utility of the sale good that he must give up. On the other hand, another individual will be a seller if his valuations of the units are in a reverse order. We have seen that, on this basis, and reinforced by the law of marginal utility, the market demand curve will never decrease when the price is lowered, and the supply curve will never increase when the price decreases.

Let us further analyze the value scales of the buyers and sellers. We have seen above that the two sources of value that a good may have are direct use-value and exchange-value, and that the higher value is the determinant for the actor. An individual, therefore, can demand a horse in exchange for one of two reasons: its direct use-value to him or the value that he believes it will be able to command in exchange. If the former, then he will be a consumer of the horse's services; if the latter, then he purchases in order to make a more advantageous exchange later. Thus, suppose in the foregoing example, that the existing market price has not reached equilibrium—that it is now at 85 barrels per horse. Many demanders may realize that this price is below the equilibrium and that therefore they can attain an arbitrage profit by buying at 85 and reselling at the final, higher price.

We are now in a position to refine the analysis in the foregoing section, which did not probe the question whether or not sales took place before the equilibrium price was reached. We now assume explicitly that the demand schedule shown in Table 2 referred to demand for direct use by consumers. Smoothing out the steps in the demand curve represented in Figure 13, we may, for purposes of simplicity and exposition, portray it as in Figure 18. This, we may say, is the demand curve for direct use. For this demand curve, then, the approach to equilibrium takes place through *actual* purchases at the various prices, and then the shortages or the surpluses reveal the overbidding or