What Do Statistical "Demand Curves" Show?

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SUMMARY

How statistical demand curves are constructed, 213. — The theory of the demand-and-supply curve analysis applied to a period of time, 217. — Statistical curves which would result under hypothetical conditions, 218. — Data used do not necessarily reflect influence of demand more than of supply, 222. — Whether fitted curve approximates a demand or supply curve depends on the relative *variability* of demand and supply, 224. — Slope of the fitted curve may not correspond to the true demand curve, 225. — In what sense may statistical demand curves be "general" demand curves? 228. — Distinction between consumer and dealer demand, 230. — Fitted curves are "static" in the sense of showing an "average" relationship, or relationship at a "typical" point of time, 231. — Do statistical demand curves assume all other things equal? 233. — Conclusions, 234.

MANY questions of practical importance hinge upon the elasticity of demand, or of demand and supply. The economist can answer them only in a vague and indefinite manner, because he does not know the nature of the demand curve. What will be the effect of a five-million-bushel increase in the corn crop upon the price of corn and of hogs? What will be the effect of a tariff on imports and prices; on the protected industry; on the balance of international payments? How large an indemnity can Germany pay? The answers all depend in greater or less measure upon the elasticity of demand of the various commodities in question.

Such are the needs of the theorist, and in recent years a great deal of attention has been turned to the construction of statistical demand curves. Beef, corn, cotton, hay, hogs, pig iron, oats, potatoes, sweet potatoes, sugar, and wheat are on the list of commodities for which we have statements of the "law of demand." Many economists have been skeptical, while others have been enthusiastic, on the significance of such demand curves. In consequence of this divergence of opinion, it may be well to consider some of the theoretical aspects of what the demand curves constructed by our statistical experts may be expected to show. Do they correspond to the demand curves of economic theory? If so, it would seem that they represent something tangible by which our theories may be tested and turned to better account.[2]

Among the statistical studies of demand that have been made, there are cases in which the same commodity has been studied by more than one investigator, and their results indicate varying degrees of elasticity of

2. Among the leading discussions of the subject, the following may be noted.

Lehfeldt, R. A., "The Elasticity of Demand for Wheat," The Economic Journal, June, 1914, pp. 212–217.

Moore, Henry L., Economic Cycles: Their Law and Cause (1914), chaps. 4 and 5, Forecasting the Yield and Price of Cotton (1917), chap. 5; "Empirical Laws of Demand and Supply and the Flexibility of Prices," Political Science Quarterly, December, 1919; "Elasticity of Demand and Flexibility of Prices," Journal of the American Statistical Association, March, 1922; "Partial Elasticity of Demand," Quarterly Journal of Economics, May, 1926; "A Moving Equilibrium of Demand and Supply," Quarterly Journal of Economics, May, 1925.

Persons, Warren M., "The Correlation of Economic Statistics," Publications of the American Statistical Association, December, 1910, pp. 287–322.

Schultz, Henry, "The Statistical Law of Demand," Journal of Political Economy, October and December, 1925.

Working, Holbrook, "The Statistical Determination of Demand Curves," Quarterly Journal of Economics, August, 1925.

In this list no attempt is made to include the many studies of demand of specific articles. A bibliography of the latter is given by Holbrook Working, Quarterly Journal of Economics, August, 1925, pp. 539–543.

demand. But despite this, in all but one of the cases the demand curves have been negatively inclined — they have been in accord with Marshall's "one general *law of demand*."[3]

In the case of pig iron, however, Professor H. L. Moore finds a "law of demand" which is not in accord with Marshall's universal rule. He finds that the greater the quantity of pig iron sold, the higher will be the prices.[4] If this is the nature of the statistical demand curve for pig iron, surely statistical demand curves must be of a very different sort from the demand curves of traditional economic theory!

Professor Moore holds that the statistical "law of demand" at which he arrives is a *dynamic* law, while that of theory is a *static* law. He says in part: "The doctrine of the uniformity of the demand function is an idol of the static state — the method of *cæteris paribus* — which has stood in the way of the successful treatment of dynamic problems." If it be true that statistical demand curves and the demand curves of theory differ so utterly from each other, of what value is statistical analysis to the theorist — of what value is economic theory to the statistical analyst? It would seem that so far as the study of demand is concerned, the statistical analyst and the economic theorist are on paths so divergent as to be wholly out of touch with each other. Before we accede to such a discouraging thought, let us examine a little more closely the nature of statistical demand curves as they may be viewed in the light of economic theory.

3. "There is then one general *law of demand:* — The greater the amount to be sold, the smaller must be the price at which it is offered in order to find purchasers; or, in other words, the amount demanded increases with a fall in price and diminishes with a rise in price." Alfred Marshall, Principles of Economics (eighth edition), p. 99.

4. Henry Ludwell Moore, Economic Cycles: Their Law and Cause (1914), p. 114.

Let us first consider in what way statistical demand curves are constructed. While both the nature of the data used and the technique of analysis vary, the basic data consist of corresponding prices and quantities. That is, if a given quantity refers to the amount of a commodity sold, produced, or consumed in the year 1910, the corresponding price is the price which is taken to be typical for the year 1910. These corresponding quantities and prices may be for a period of a month, a year, or any other length of time which is feasible; and, as has already been indicated, the quantities may refer to amounts produced, sold, or consumed. The technique of analysis consists of such operations as fitting the demand curve, and adjusting the original data to remove, in so far as is possible, the effect of disturbing influences. For a preliminary understanding of the way in which curves are constructed, we need not be concerned with the differences in technique; but whether the quantities used are the amounts produced, sold, or consumed is a matter of greater significance, which must be kept in mind.

For the present, let us confine our attention to the type of study which uses for its data the quantities which have been sold in the market. In general, the method of constructing demand curves of this sort is to take corresponding prices and quantities, plot them, and draw a curve which will fit as nearly as possible all the plotted points. Suppose, for example, we wish to determine the demand curve for beef. First, we find out how many pounds of beef were sold in a given month and what was the average price. We do the same for all the other months of the period over which our study is to extend, and plot our data with quantities as abscissas and corresponding prices as ordinates. Next we draw a curve to fit the points. This is our demand curve.

In the actual construction of demand curves, certain refinements necessary in order to get satisfactory results are introduced.[5] The purpose of these is to correct the data so as to remove the effect of various extraneous and complicating factors. For example, adjustments are usually made for changes in the purchasing power of money, and for changes in population and in consumption habits. Corrections may be made directly by such means as dividing all original price data by "an index of the general level of prices." They may be made indirectly by correction for trends of the two time series of prices and of quantities. Whatever the corrections and refinements, however, the essence of the method is that certain prices are taken as representing the prices at which certain quantities of the product in question were sold.

With this in mind, we may now turn to the theory of the demand-and-supply curve analysis of market prices. The conventional theory runs in terms substantially as follows.[6] At any given time all individuals within the scope of the market may be considered as being within two groups — potential buyers and potential sellers.[7] The higher the price, the more the sellers will be ready to sell and the less the buyers will be willing to take. We may assume a demand schedule of the potential buyers and a supply schedule of the potential sellers which express the amounts that these groups are ready to buy

5. Instead of using actual prices and quantities, percentage changes or link relatives of prices and quantities may be used. In note 2 on page 213 will be found references to various discussions of the details of statistical procedure used in the consideration of demand curves and also of the theory of statistical analysis of demand curves.

6 Alfred Marshall, Principles, book v, chap. 2. F. W Taussig, Principles, chap. 10; "Is Market Price Determinate?" Quarterly Journal of Economics, May, 1921, p. 204.

7. This does not mean that the same individual may not be in both groups. He may be a potential seller at any price above a certain level and a potential buyer at any price below.

and sell at different prices. From these schedules supply and demand curves may be made. Thus we have our supply and demand curves showing the market situation at any given time, and the price which results from this situation will be represented by the height of the point where the curves intersect.

This, however, represents the situation as it obtains at any given moment only. It may change; indeed, it is almost certain to change. The supply and demand curves which accurately represent the market situation of to-day will not represent that of a week hence. The curves which represent the average or aggregate of conditions this month will not hold true for the corresponding month of next year. In the case of the wheat market, for example, the effect of news that wheat which is growing in Kansas has been damaged by rust will cause a shift in both demand and supply schedules of the traders in the grain markets. The same amount of wheat, or a greater, will command a higher price than would have been the case if the news had failed to reach the traders. Since much of the buying and selling is speculative, changes in the market price itself may result in shifts of the demand and supply schedules.

If, then, our market demand and supply curves are to indicate conditions which extend over a period of time, we must represent them as shifting.[8] A diagram such as the following, Figure I, may be used to indicate them.

8. Compare Taussig, "Is Market Price Determinate?" Quarterly Journal of Economics, May, 1921, p. 204. This article illustrates a somewhat different way of representing market conditions. It represents the curves as being of uncertain conformation rather than as shifting.

QUANTITY
FIGURE I
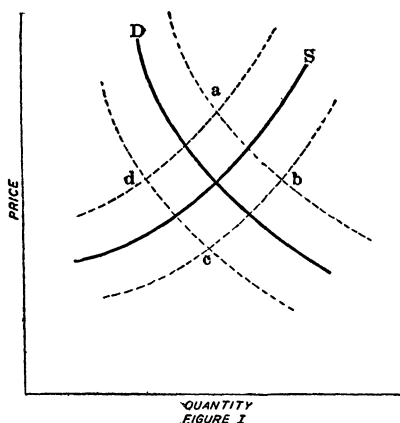
The demand and supply curves may meet at any point within the area *a, b, c, d,* and over a period of time points of equilibrium will occur at many different places within it.

But what of statistical demand curves in the light of this analysis? If we construct a statistical demand curve from data of quantities sold and corresponding prices, our original data consist, in effect, of observations of points at which the demand and supply curves have met. Altho we may wish to reduce our data to static conditions, we must remember that they originate in the market itself. The market is dynamic and our data extend over a period of time; consequently our data are of changing conditions and must be considered as the result of shifting demand and supply schedules.

Let us assume that conditions are such as those illustrated in Figure II, the demand curve shifting from D1 to D2, and the supply curve shifting in similar manner from S1 to S2. It is to be noted that the chart shows approximately equal shifting of the demand and supply curves.

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FIGURE II
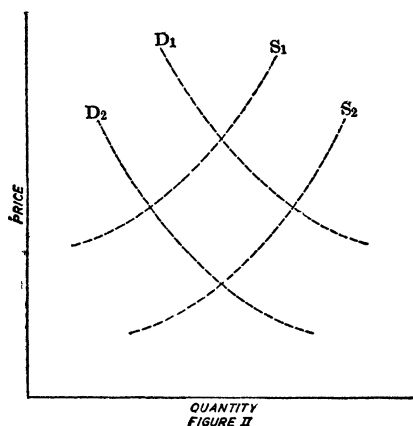
Under such conditions there will result a series of prices which may be graphically represented by Figure III. It is from data such as those represented by the dots that we are to construct a demand curve, but evidently no satisfactory fit can be obtained. A line of one slope will give substantially as good a fit as will a line of any other slope.

QUANTITY
FIGURE III
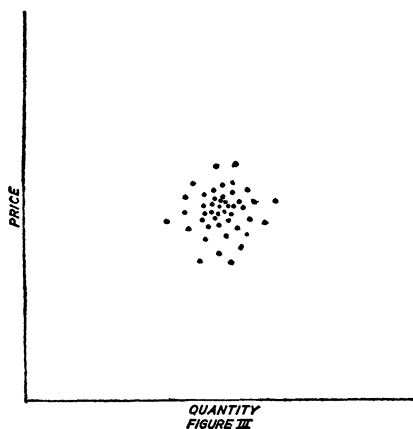
But what happens if we alter our assumptions as to the relative shifting of the demand and supply curves? Suppose the supply curve shifts in some such manner as is indicated by Figure IV, that is, so that the shifting of the supply curve is greater than the shifting of the de-

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FIGURE IV
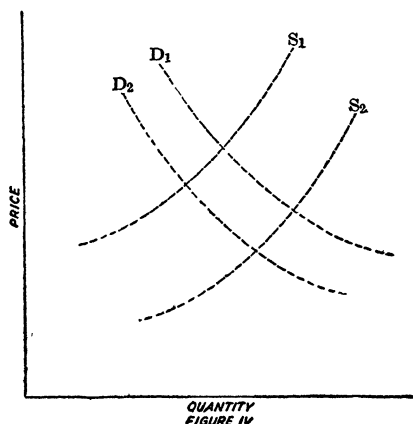
mand curve. We shall then obtain a very different set of observations — a set which may be represented by the dots of Figure V. To these points we may fit a curve

QUANTITY
FIGURE V
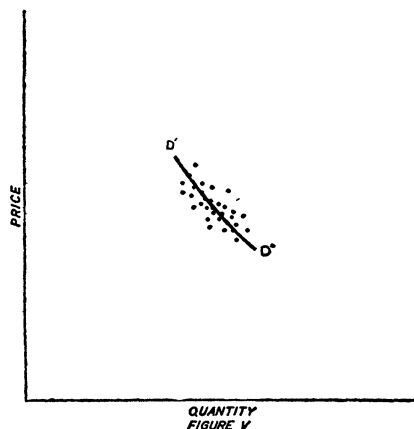
which will have the elasticity of the demand curve that we originally assumed, and whose position will approximate the central position about which the demand curve shifted. We may consider this to be a sort of typical demand curve, and from it we may determine the elasticity of demand.

If, on the other hand, the demand schedules of buyers fluctuate more than do the supply schedules of sellers, we shall obtain a different result. This situation is illustrated by Figure VI. The resulting array of prices and quantities is of a very different sort from the previous case, and its nature is indicated by Figure VII. A line drawn so as most nearly to fit these points will approximate a supply curve instead of a demand curve.

FIGURE VI

QUANTITY
FIGURE VII
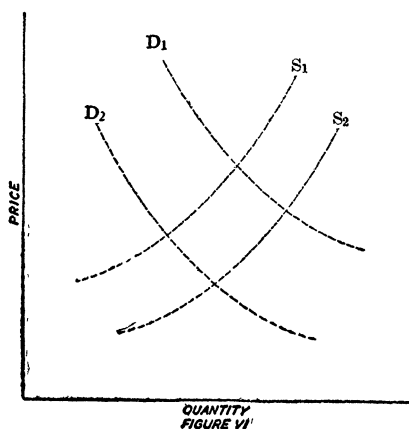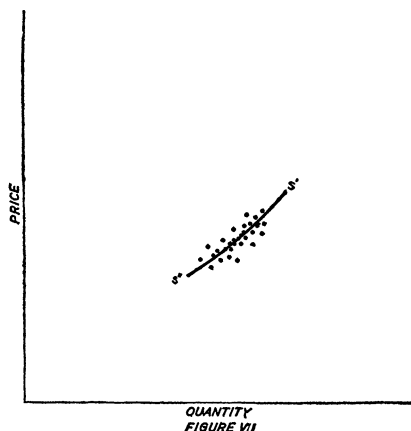
If this analysis is in accord with the facts, is it not evident that Professor Moore's "law of demand" for pig iron is in reality a "law of supply" instead? [9] The original observations of prices and corresponding quantities are the resultant of both supply and demand. Consequently, they do not necessarily reflect the influence of demand any more than that of supply. The methods used in constructing demand curves (particularly if the quantity data are of quantities sold) may, under some conditions, yield a demand curve, under

9. P. G. Wright (Quarterly Journal of Economics, May, 1915, p. 638) comes to the same conclusion, in a review of Moore's Economic Cycles. Furthermore, his analysis bears some resemblance to that above. However, his specific argument is unfortunate in that he says "the conditions of demand are changed (very probably by improved business conditions) in the direction of a rapid and continuous increase." Apparently Mr. Wright had in mind the results which would be obtained by the use of absolute quantities and prices instead of relative changes in quantities and prices. The trend inherent in the production figures due to a continuous increase in demand would tend to be eliminated by Moore's use of *relative* changes in quantities unless there were a distinctly progressive increase. Mr. Wright's contention that the peculiar result was due to a shifting of the demand curve is quite correct. Mr. Wright, to whom the present paper has been submitted, now concurs that the result is due to a shifting back and forth rather than to a continuous shift of the demand curve to the right.

others, a supply curve, and, under still different conditions, no satisfactory result may be obtained.

In the case of agricultural commodities, where production for any given year is largely influenced by weather conditions, and where farmers sell practically their entire crop regardless of price, there is likely to be a much greater shifting of the supply schedules of sellers than of the demand schedules of buyers. This is particularly true of perishable commodities, which cannot be withheld from the market without spoilage, and in case the farmers themselves can under no conditions use more than a very small proportion of their entire production. Such a condition results in the supply curve shifting within very wide limits. The demand curve, on the other hand, may shift but little. The quantities which are consumed may be dependent almost entirely upon price, so that the only way to have a much larger amount taken off the market is to reduce the price, and any considerable curtailment of supply is sure to result in a higher price.

With other commodities, the situation may be entirely different. Where a manufacturer has complete control over the supply of the article which he produces, the price at which he sells may be quite definitely fixed, and the amount of his production will vary, depending upon how large an amount of the article is bought at the fixed price. The extent to which there is a similar tendency to adjust sales to the shifts of demand varies with different commodities, depending upon how large overhead costs are and upon the extent to which trade agreements or other means are used to limit competition between different manufacturers. In general, however, there is a marked tendency for the prices of manufactured articles to conform to their expenses of production, the amount of the articles sold varying with the inten-

sity of demand at that price which equals the expenses of production. Under such conditions, the supply curve does not shift greatly, but rather approximates an expenses-of-production curve, which does not vary much from month to month or from year to year. If this condition is combined with a fluctuating demand for the product, we shall have a situation such as that shown in Figures VI and VII, where the demand curves shift widely and the supply curves only a little.

From this, it would seem that, whether we obtain a demand curve or a supply curve, by fitting a curve to a series of points which represent the quantities of an article sold at various prices, depends upon the fundamental nature of the supply and demand conditions. It implies the need of some term in addition to that of elasticity in order to describe the nature of supply and demand. The term "variability" may be used for this purpose. For example, the demand for an article may be said to be "elastic" if, at a given time, a small reduction in price would result in a much greater quantity being sold, while it may be said to be "variable" if the demand curve shows a tendency to shift markedly. To be called variable, the demand curve should have the tendency to shift back and forth, and not merely to shift gradually and consistently to the right or left because of changes of population or consuming habits.

Whether a demand or a supply curve is obtained may also be affected by the nature of the corrections applied to the original data. The corrections may be such as to reduce the effect of the shifting of the demand schedules without reducing the effect of the shifting of the supply schedules. In such a case the curve obtained will approximate a demand curve, even tho the original demand schedules fluctuated fully as much as did the supply schedules.

By intelligently applying proper refinements, and making corrections to eliminate separately those factors which cause demand curves to shift and those factors which cause supply curves to shift, it may be possible even to obtain both a demand curve and a supply curve for the same product and from the same original data. Certainly it may be possible, in many cases where satisfactory demand curves have not been obtained, to find instead the supply curves of the articles in question. The supply curve obtained by such methods, it is to be noted, would be a market supply curve rather than a normal supply curve.

Thus far it has been assumed that the supply and demand curves shift quite independently and at random; but such need not be the case. It is altogether possible that a shift of the demand curve to the right may, as a rule, be accompanied by a shift of the supply curve to the left, and vice versa. Let us see what result is to be expected under such conditions. If successive positions of the demand curve are represented by the curves D_1, D_2, D_3, D_4, and D_5 of Figure VIII, while the curves S_1,

QUANTITY
FIGURE VIII
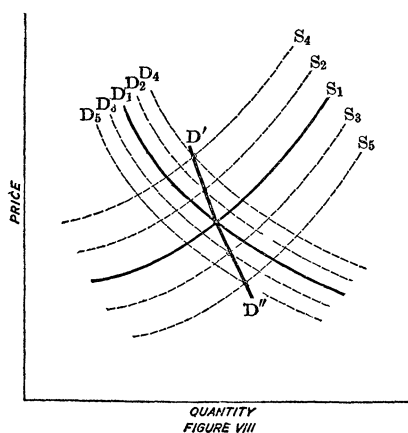
S_2, S_3, S_4, and S_5 represent corresponding positions of the supply curves, then a series of prices will result from the intersection of D_1 with S_1, D_2 with S_2, and so on. If a curve be fitted to these points, it will not conform

QUANTITY
FIGURE IX
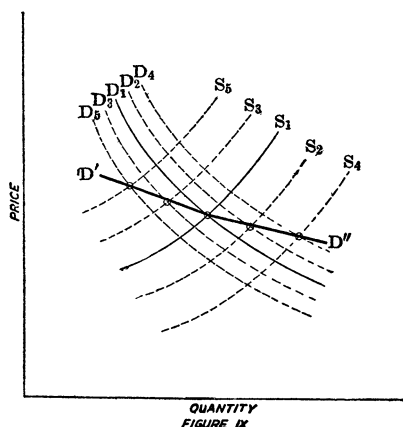
to the theoretical demand curve. It will have a smaller elasticity, as is shown by D' D'' of Figure VIII. If, on the other hand, a shift of the demand curve to the right is accompanied by a shift of the supply curve to the right, we shall obtain a result such as that indicated by D' D'' in Figure IX. The fitted curve again fails to conform to the theoretical one, but in this case it is more elastic.

Without carrying the illustrations further, it will be apparent that similar reasoning applies to the fitted "supply curve" in case conditions are such that the demand curve shifts more than does the supply curve

If there is a change in the range through which the supply curve shifts, as might occur through the imposition of a tariff on an imported good, a new fitted curve will result, which will not be a continuation of the former one — this because the fitted curve does not correspond

to the true demand curve. In case, then, of correlated shifts of the demand and supply curves, a fitted curve cannot be considered to be the demand curve for the article. It cannot be used, for example, to estimate what change in price would result from the levying of a tariff upon the commodity.

Perhaps a word of caution is needed here. It does not follow from the foregoing analysis that, when conditions are such that shifts of the supply and demand curves are correlated, an attempt to construct a demand curve will give a result which will be useless. Even tho shifts of the supply and demand curves are correlated, a curve which is fitted to the points of intersection will be useful for purposes of price forecasting, provided no new factors are introduced which did not affect the price during the period of the study. Thus, so long as the shifts of the supply and demand curves remain correlated in the same way, and so long as they shift through approximately the same range, the curve of regression of price upon quantity can be used as a means of estimating price from quantity.

In cases where it is impossible to show that the shifts of the demand and supply curves are not correlated, much confusion would probably be avoided if the fitted curves were not called demand curves (or supply curves), but if, instead, they were called merely lines of regression. Such curves may be useful, but we must be extremely careful in our interpretation of them. We must also make every effort to discover whether the shifts of the supply and demand curves are correlated before interpreting the results of any fitted curve.

In assuming that we are dealing with quantities actually sold in the market, and in disregarding the fact that for many commodities there is a whole series of

markets at various points in the marketing chain, we have simplified our problem. But it has been more than mere simplification, for the interpretation which is to be placed on statistical demand curves depends in large measure upon these matters. Whether the demand curve is a "particular" or a "general" demand curve, depends upon whether or not we use quantities sold. Whether it represents consumer or dealer demand, depends upon the point in the marketing chain to which the quantities sold refer.

Most theorists are acquainted with the concept of the general demand curve as it is presented by Wicksteed and Davenport.[1] Briefly, the idea is that demand should be considered as including not merely the quantities that are bought, but rather all those in existence. The general demand curve, then, includes the possessors of a commodity as having a demand for it at any price below their reservation price, even if they are prospective sellers. Instead of showing the amounts that will be bought at various prices, it shows the marginal money valuation which will be placed upon varying quantities of an existing supply.

Wicksteed even indicates that the supply curve ought not to be considered at all. The following gives an intimation of his viewpoint:

But what about the "supply curve" that usually figures as a determinant of price, coordinate with the demand curve? I say it boldly and baldly: There is no such thing. When we are speaking of a marketable commodity, what is usually called a supply curve is in reality a demand curve of those who possess the commodity; for it shows the exact place which every successive unit of the commodity holds in their relative scale of estimates. The so-called supply curve, therefore, is simply a part of the total demand curve.[2]

1. P. H. Wicksteed, "The Scope and Method of Political Economy in the Light of the 'Marginal' Theory of Value," Economic Journal, March, 1914, p. 1. See also H. J. Davenport, Economics of Enterprise, pp 47–51.
2. Wicksteed, ibid., p. 13.

Thus the general demand curve is an expression of the relation between the supply of a commodity and its valuation. In other words, to put it in more familiar terms, it expresses the marginal valuation of different supplies. It is the same sort of thing as a curve of marginal utility, except that it uses monetary valuations instead of abstract "satisfactions" as its ordinate. This raises the question, if, instead of quantities sold, we use quantities produced (total supply) when we construct a statistical demand curve, do we not obtain a general demand curve, and does not this preclude the possibility of obtaining a supply curve? Let us examine the matter a little further.

As it is usually applied, the idea of the general demand curve refers to valuations of an existing stock of durable goods, such as paintings, diamonds, or hats. If it is applied to a stock of non-durable goods, it is of less significance; and in case this stock is replenished periodically, the demand curve must be considered as changing greatly from period to period. For example, in the case of wheat the stock varies greatly, being large just after harvest and gradually dwindling until it becomes very small just before the next harvest. The general demand curve, as applied to an existing stock, would exhibit correspondingly large shifts.

An idea similar to that of the general demand curve is that which is used in regard to *rate* of supply. If, instead of using the rates at which quantities are sold in the market, we use rate of production, which we equate with the unit value of the commodity, we obtain a term which is analogous to the general demand curve. It gives the marginal valuation which would be placed upon various rates of supply, that is, of supplies produced, not of supplies sold. This sort of a demand curve has been called a "general" demand curve, but it is to

be noted that the general demand curve which uses total stocks as its abscissa cannot be placed as coördinate with a supply curve; whereas the demand curve which uses as abscissa total quantities produced can be used in connection with a supply curve of quantities produced.

The use of quantities produced, then, does not give us a general demand curve in the usual sense of the word. Instead, it gives us a demand curve which we may consider as being coördinate with a supply curve, tho we must keep in mind that our supply curve in this case is of supplies produced rather than of supplies sold in the market. The demand curve is of demand for storage and consumption by producers as well as for storage and consumption by buyers. There is no reason why we may not obtain a supply curve instead of a demand curve, even tho we use quantities produced. To do so requires only that shifts in the demand curve be very large relative to those of the supply curve, and that amounts sold differ but little from amounts produced. The scatter of the points will, of course, be greater than if amounts sold had been used.

The question of the difference between consumer and dealer demand presents a problem somewhat analogous to that just discussed. The amount of a commodity sold at one point in the marketing chain may differ from that sold at another in much the same way that the amount produced may differ from the amount sold. This is particularly true if monthly data are used. A case in point would be the demand for eggs. The amount of eggs sold by farmers in the spring of the year is greatly in excess of the amount sold by retail dealers, while in the winter months it is much less. Since differentials between the prices received by farmers and those received by retail dealers remain fairly constant,

very different demand curves would be obtained. The consumers' demand curve would be very much less elastic than that of the dealers who buy from farmers.

Differences between dealer demand and consumer demand are largely dependent upon whether we are considering short or long periods. Over long periods of time, dealer demand tends to conform to consumer demand. This difference, however, is not a thing which depends upon the length of period over which the data extend, but of the length of period to which the individual observations of prices and quantities refer. In the case of eggs, if yearly data were used, the principal difference which would be found between the elasticity of consumer and dealer demands would be due to price differentials alone.

The question whether statistical demand curves are static or dynamic is a perplexing one and rather difficult to deal with. This is largely due to uncertainty as to just what is meant by the terms "static" and "dynamic." Moore holds that his "laws of demand" are dynamic.[3] and that this is an eminently desirable feature. Schultz, while considering it most desirable to obtain both a static and a dynamic law by means of multiple correlation, holds that the statistical devices of relative changes and of trend ratios give a static "law of demand."[4]

Conditions are often defined as being static or dynamic on two different grounds. They may be called static if they refer to a point of time; or else they may be said to be static if all other things are held equal. Statements such as these, however, lack much in clarity and accuracy. How can a statement be made as to prices at

3. Economic Cycles, pp. 64–67, 113.
4. Henry Schultz, "The Statistical Law of Demand," Journal of Political Economy, October and December, 1925. See pp. 498–502 of October issue.

which different quantities of a commodity will sell at a *point* of time? Is it really supposed that *all* other things must be held equal in order to study the demand of the commodity? Rather, the real supposition, tho it may not be accurately expressed, is that the relationships between the various economic factors should be the same as those which exist at a given point of time, or that the relationships between these factors should remain constant.

The data used in a statistical study of demand must, of course, extend over a period of time, but they may in effect conform to conditions at a point of time if trend is removed and if there is no other change in the relationship between quantity and price. Of course, the shifting of the demand and supply curves constitutes a change in the relationship between the quantity and price, but the process of curve-fitting corresponds to that of averaging. Consequently, the fitted curve may be considered to depict the average relationship between quantity and price. This amounts to the same thing as representing the relationship at a point of time which is typical for the period studied. In this sense, then, of relating to a point of time, Moore's "laws of demand" are static instead of dynamic.

Holding "all other things equal," however, is a different matter. Schultz states the difficulty in the following manner:

In *theory* the law of demand for any one commodity is given only on the assumption that the prices of all other commodities remain constant (the old *ceteris paribus* assumption). This postulate fails in the case of commodities for which substitutes are available. Thus when the price of beef is changed markedly, the prices of such rival commodities as mutton, veal, and pork cannot be supposed to remain constant. Likewise, the price of sugar cannot be increased beyond a certain point without affecting the prices of glucose, corn sugar, and honey.[5]

5. Ibid., pp. 498–499.

Marshall makes similar restrictions as to the need for other things to be held equal, and suggests that in some cases it may be best to "group together commodities as distinct as beef and mutton," [6] in order to obtain a demand curve which will not be too restricted because of other things being equal.

The question arises, however, whether it is desirable to hold all other things equal in any case. Is it not better to have a demand curve for beef which expresses the relation between the price and quantity of beef while the prices of pork, mutton, and veal, vary as they normally do, with different prices of beef? Furthermore, may not this be called a static condition? The point can perhaps be made clearer if we take an extreme example. If we are studying the demand for wheat, it would be almost meaningless to get the demand curve for No. 2 Winter wheat while holding the price of all other grades of wheat constant. Other grades of wheat can be so readily substituted that the demand would be almost completely elastic. The difference between this and holding the prices of pork, mutton, and veal constant, while the price of beef varies, is only one of degree — a difference which depends upon the ease with which substitutes can be used in place of the article whose demand is being studied.

All other things being held equal is not a condition represented by a statistical law of demand or, strictly interpreted, of any useful demand curve theory. Some of the things that are correlated with the price of the commodity in question may be held equal, but it is impossible for all things to be held equal. However, a statistical law of demand represents a condition under which the relationships between factors may be considered to have remained the same, or, to put it more

6. Alfred Marshall, Principles (eighth edition), p. 100 n.

accurately, a condition which is an average of the rela-
tionships during the period studied.

In conclusion, then, it is evident that the mere state-
ment that the demand for a commodity has a given
elasticity is meaningless. As with the results of all other
statistical analysis, statistical demand curves must be
interpreted in the light of the nature of the original data
and of the methods of analysis used. There are four
questions, the answers to which it is particularly im-
portant to know. They concern (1) whether the supply
or demand curve is more variable, (2) the market to
which the price and quantity data refer, (3) the extent
to which "other things are held equal," and (4) whether
the shifting of the supply and demand curves is corre-
lated or random.

For precision, it is preferable that the data of price
and quantity should refer to the same market. Yet this
may be out of the question. In a study of the demand
for wheat, for example, if we want to obtain a demand
curve of the quantity demanded by the entire country,
we cannot use prices for all different points and for all
different grades. Instead, the price at one market and
for one grade may be used as representative, and the
demand of the entire country determined for various
prices at the one market-place. If the price at any other
market or for any other grade were used, the elasticity
of demand might be different.

Furthermore, the point in the market chain must be
specified and the results intérpreted accordingly. As is
the case with geographical points, it is preferable that
the quantities and prices should refer to the same stage
in the marketing process. If this is not the case, the in-
terpretation should be made with the situation in view.

It is to be expected that the methods used in con-

structing statistical demand curves should be such as to give a demand curve which represents a point of time, that is, that trends in both quantities and prices are removed, or else multiple correlation is used to effect the same result. If, in addition to this, other things are held constant, the fact should be noted and the elasticity of demand should be stated as referring to a condition where these other things are held constant

The matter of correlation between shifts of the demand and supply curves is a more difficult problem to deal with. Every effort should be made to discover whether there is a tendency for the shifting of these to be interdependent. In case it is impossible to determine this, it should be carefully noted that the demand curve which is obtained is quite likely not to hold true for periods other than the one studied, and cannot be treated as corresponding to the demand curve of economic theory.

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