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Chapter Title: Relations between Prices and Price-Determining Factors: Price Flexibility

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of price movements during recession has been more consistent than the sequence of price changes during revival.

The various coefficients presented in the preceding tables have shown that there are significant interrelations among the several measures relating to the timing, duration and amplitude of cyclical price movements. The individual measures have been derived, it will be recalled, by applying to more than two hundred price series a standardized procedure for measuring the changes in commodity prices which have accompanied cycles in general business. After the individual measures had been secured, tests of relationship were made. It is highly significant that these subsequent tests revealed the presence of a common pattern in these cyclical price movements. True regularities, which clearly reflect the influence of forces other than chance, are found in the cyclical movements of commodity prices.

V Relations Between Prices and Price-Determining Factors: Price Flexibility

In the four preceding sections certain general characteristics of commodity prices have been dealt with. In describing these attributes attention was concentrated on price changes, with no reference to specific factors which might have produced these changes. The present section is concerned with those movements in the prices of individual commodities which are related in some measurable way to specific economic factors. We are concerned, that is, with the general problem of price determination, though certain aspects only of this broad subject can be considered in the present study.

This section differs from those which have preceded it in that no compilation of measures relating to a number of commodities is attempted. A brief account is given of methods which have been developed elsewhere, and several examples are included as illustrations of procedure. So much is necessary in any complete account of measures of price behavior. A collection of measures of the type here described, suitable in quality and quantity for a study of group behavior, waits upon the future.

1. Measures Needed in Defining the Relationship Between Prices and Price-Determining Factors

In studying the factors affecting the price of any commodity we are working upon an old problem, that of defining the relationship between variable quantities. In this case the dependent variable is the price of the commodity in question. There may be one or many independent variables—the quantity (of this commodity) produced, the stocks held over from a preceding year, the quantity consumed, the price of a substitute, the general level of prices, and so on without limit, if all related factors were to be considered. In general, of course, the study must be confined to a limited number of the most important price-determining factors.

The measures necessary to a definition of the relationship in question are those which are required in every study of relations between variable quantities, with two rather important additions. The basic measures, apart from these additions, are an equation which defines the functional relationship between the price of the commodity in question and the chief factors which affect this price, a measure of the reliability of this equation (the standard error of estimate), and an abstract measure of the degree of relationship between the price of the commodity in question and the factors affecting this price, considered severally or collectively (the coefficient or index of correlation, simple, partial, or multiple). These customary measures may, in the study of price determination, be supplemented by two important additional measures, the coefficient of determination and the coefficient of price flexibility.

The coefficient of determination is a statistical device[1] which is particularly appropriate for use in problems of price determination. It is a measure of the proportion of the squared variability of the dependent variable which may be attributed, on the assumption of a causal relationship,[2] to one or more independent variables. In the simple case, where only two variables are concerned, the coefficient of determination is equal to the square of the coefficient of correlation. Its derivation under other conditions is discussed in the references cited.

The coefficient of flexibility, as defined by Henry L. Moore,[3]

[1]The original presentation may be found in an article on "Correlation and Causation," by Sewall Wright, in the *Journal of Agricultural Research*, January, 1921, pp. 557-585. An account of this measure is given by B. B. Smith in "Forecasting the Acreage of Cotton," *Journal of the American Statistical Association*, March, 1925, pp. 31-47.

[2]The name of the coefficient indicates the assumption that the fluctuations in the dependent variable are in some part *determined* by fluctuations in the independent variable. Whether this assumption is or is not valid must be determined, of course, upon the basis of other evidence than the purely statistical relationship. In problems of price determination there is generally ample justification for assuming such a causal connection, a fact which validates the general use of the coefficient of determination in such investigations.

[3]"Elasticity of Demand and Flexibility of Prices," *Journal of the American Statistical Association*, March, 1922.

may be *simple* or *partial*, using these terms as they are employed in respect to measures of correlation. The simple coefficient, which is based upon the relation between the price of a given commodity and the quantity of that commodity marketed, is given by the expression

$$\phi = \frac{x}{y} \cdot \frac{dy}{dx} = \frac{d \log y}{d \log x}$$

where y represents price and x represents quantity. The coefficient of flexibility is the ratio of the relative change in the price, per unit of commodity, to the corresponding relative change in the quantity, when the relative changes are infinitesimal.[1] This function measures the rate of variation in the price of a commodity as the quantity factor varies. It may be taken as an index of the sensitivity of price to changes in quantity. By convention, taken over from Marshall's[2] treatment of elasticity of demand, the price of a commodity is considered to be *flexible* if ϕ is numerically greater than 1, *inflexible* if ϕ is numerically less than 1.

From the above definition it follows, of course, that the flexibility of price of a given commodity cannot be determined until an equation, describing the functional relation between prices and

[1]The measure of elasticity of demand, the concept of which is perhaps more familiar, is analogous to the measure of price flexibility. The coefficient of elasticity of demand may be derived when quantity is the dependent variable and price the independent variable. It is given by the expression

$$\eta = \frac{y}{x} \cdot \frac{dx}{dy}$$

where x represents quantity and y price. The coefficient of elasticity of demand is the ratio of the relative change in the quantity demanded to the relative change in the price.

A problem of major importance in this field relates to the method of deriving the equation of relationship between prices and quantities. When prices (represented by the symbol y) are taken as dependent, quantity (x) being treated as the independent variable, it is assumed that all the "errors" (using that word in the sense in which it is employed in connection with the theory of least squares) are in y. When quantity is treated as the dependent variable it is assumed that all the "errors" are in x. It is customary to make the first assumption when the flexibility of prices is to be measured, and to make the second assumption when the coefficient of elasticity of demand is sought. Inconsistent values of these two coefficients will be secured by these processes (except when the relationship between prices and quantities is a perfect one). If consistent values of η and ϕ are required, as in most cases which arise in practice, it is necessary that some method of fitting should be employed in which allowance is made for the likelihood of errors in both variables. Such a method has been employed by Dr. Henry Schultz in his investigation of the elasticity of demand for sugar, and this general problem is discussed in detail in his work "The Statistical Law of Demand as Illustrated by the Demand for Sugar," *Journal of Political Economy*, October, December, 1925.

[2]Alfred Marshall stated the problem of determining elasticity of demand in this particular form, but the concept and the rigorous definition of terms date back to Cournot (*Researches into the Mathematical Principles of the Theory of Wealth*). Recent substantial progress in improving the technique of attack upon this important and difficult problem is due largely to the work of Henry L. Moore.

quantities, has been derived. This equation may be of any appropriate type. For most curve types the flexibility of prices for a given commodity will not be constant, but will vary from point to point on the curve. It is desirable, for the purpose of general comparison and grouping, to have for each commodity a single measure of price flexibility. This end is served if we can describe the relationship between prices and quantities by a curve for which the flexibility is constant. This is true of curves described by equations of the type $Y = aX^b$. Such a function may be cast into the logarithmic form

$$\log Y = \log a + b (\log X).$$

By definition, the coefficient of flexibility is equal to $\frac{d \log y}{d \log x}$.
Hence for an equation of this type the coefficient of price flexibility is equal to the constant b in the equation of relationship.

As an alternative to the employment of this type of demand curve, a single measure of flexibility may be secured by measuring the flexibility at a single point on the curve, selecting that point which represents an approximation to average conditions. This may be done, if quantity is represented by ratios (i. e. link ratios or trend ratios), by finding the flexibility at that point on the curve for which the quantity ratio has a value of 1.0.

In a recent contribution[1] Henry L. Moore has materially broadened the concept of price flexibility, and has sharpened the tools of attack. This advance was made in introducing the concept of partial flexibility of prices (and partial elasticity of demand) as a natural development of the theory of multiple and partial correlation. As means of correcting for the influence of complicating factors and reducing to comparable terms coefficients of price flexibility for different commodities, measures of partial flexibility are of particular importance from the viewpoint of the present study.

§Coefficients of Partial Flexibility of Prices

A given price may, of course, be expressed as a function of several independent variables. Thus the price, X_1, of a given commodity may be expressed as a function of three variables, X_2, X_3 and X_4, by means of an equation of the type

$$X_1 = a + b_{12.34} X_2 + b_{13.24} X_3 + b_{14.23} X_4$$

where $b_{12.34}$ is the coefficient of net regression of X_1 on X_2, $b_{13.24}$ is the coefficient of net regression of X_1 on X_3, etc. In other words, $b_{12.34}$ measures the weight given to X_2 in estimating X_1, when account is also taken of

[1] "Partial Elasticity of Demand," *Quarterly Journal of Economics*, May, 1926.

the variables X_3 and X_4 in making the estimate. Professor Moore has shown how, from these coefficients of net or partial regression, coefficients of partial flexibility of price may be obtained.

The simple coefficient of price flexibility is given by the expression $\phi = \frac{x}{y} \cdot \frac{dy}{dx}$, where y represents price and x quantity. The coefficient of partial flexibility, when there are four variables, represented by the symbols employed above, is defined as follows:

$$\phi_{12.34} = \frac{x_2}{x_1} \cdot \frac{\partial x_1}{\partial x_2}$$

The coefficient $\frac{x_2}{x_1} \cdot \frac{\partial x_1}{\partial x_2}$ measures the partial flexibility of X_1 with respect to X_2, when X_1 is expressed as a function of X_2, X_3 and X_4. By similar means, the partial flexibility of X_1 with respect to each of the other variables may be determined. The method may be extended to take in any number of variables, following precisely the analogy of partial correlation.

The problem in a given case is to determine the values of the various coefficients of partial flexibility. The simplest assumption, as Professor Moore points out, is to assume that ϕ is a constant. This assumption leads us, in attempting to measure simple flexibility, to use an equation of the form

$$\log Y = \log a + b (\log X).$$

If this type of equation be employed, the coefficient of flexibility is equal to the constant b, the coefficient of regression. In attempting to measure the partial flexibility of price, with respect to each of a number of independent variables, this assumption leads us to employ an equation of the form

$$\log X_1 = \log a + b_{12.34} \log X_2 + b_{13.24} \log X_3 + b_{14.23} \log X_4.$$

(This may be extended, of course, to include any number of variables.) If this be done we have, for the coefficient of partial flexibility,

$$\phi_{12.34} = \frac{x_2}{x_1} \cdot \frac{\partial x_1}{\partial x_2} = b_{12.34}$$

similarly

$$\phi_{13.24} = b_{13.24}$$

All the coefficients of partial flexibility of prices may be derived in a similar fashion. If quantity, instead of price, be used as the dependent variable in an equation of the above type, the coefficients of partial elasticity of demand are identical with the corresponding coefficients of net regression.

2. Relation Between the Price and Production of Hay in the United States

Data suitable for a simple illustration of some of the measures we have discussed are shown in the following table. Here are given figures for the production of tame hay in the United States, by years, from 1890 to 1925, the average annual (crop year) wholesale prices of hay in Chicago over the same period, corresponding values of an index of wholesale prices[1] and, finally, deflated hay prices. The latter figures have been obtained by dividing the actual prices by the general index. This process eliminates, in a rough fashion, the effect upon hay prices of changes in the purchasing power of money.

The price and quantity data may be cast into several forms in studying the relationship with which we are here concerned. The simplest form, and one which has much to commend it, is that of link relatives. That is, the observations relating to prices and quantities in a given year are expressed as percentages of the corresponding observations for the year preceding. These link relatives appear in columns (3) and (7) of Table 50.

Points corresponding to the paired link relatives are plotted in Figure 8. It is obvious that there is a relationship between year-to-year changes in the total production of tame hay in the United States and year-to-year changes in the deflated price of hay at Chicago. This relationship is described by the following measures. (The symbol Y represents the link relatives of prices, while X represents the link relatives of production.)

Equation of relationship: $\log Y = 3.93434 - .96454 \log X$
Standard error of estimate in logarithmic form = .04643
Standard error of estimate in percentage form = 10.7
Coefficient of correlation = —.73
Coefficient of determination = .53
Coefficient of price flexibility = —.96

The standard deviation of the logarithms of the price relatives, which may be compared with the standard error of estimate, is .06753 (in percentage form 15.6). The graph of the equation of relationship appears in Figure 8.

These various measures furnish a fairly accurate description of the relationship which prevailed, from 1890 to 1925, between the production of hay in the United States and the price of hay in Chicago. The equation gives a precise statement of the average relationship. The reliability of estimates made from this equation is measured by the standard error of estimate in percent-

[1]The wholesale price index of the U. S. Bureau of Labor Statistics has been averaged by crop years for the period 1900-1925. For the years 1890-99, for which it is given only on an annual basis, approximate crop year values have been derived by averaging successive calendar years.

age form, which has a value of 10.7 per cent. That is, the true price should differ from the estimated price by not more than 10.7 per cent, in approximately 68 per cent of all cases. The coefficient

TABLE 50

PRICES AND PRODUCTION OF HAY IN THE UNITED STATES, WITH INDEX OF WHOLESALE PRICES, 1890-1925 (crop years)[1]

(1) Year	(2) Production tame hay (unit=1000 short tons)	(3) Link rel. of production	(4) Wholesale price per short ton (Timothy No. 1, Chicago) crop year average	(5) Index of wholesale prices (U. S. B. of L. S.) crop year average	(6) Deflated hay price, crop year average	(7) Link rel. of deflated price
1890	60,198		$10.96	80.5	$13.61	
1891	60,818	101.0	12.39	77.5	15.99	117.5
1892	59,824	98.4	11.47	76.0	15.09	94.4
1893	65,766	109.9	10.42	73.0	14.27	94.5
1894	54,874	83.4	10.62	69.5	15.28	107.1
1895	47,079	85.8	11.97	68.5	17.48	114.4
1896	54,380	115.5	8.81	67.0	13.15	75.2
1897	58,878	108.3	8.57	68.5	12.52	95.2
1898	66,772	113.4	8.53	72.5	11.77	94.0
1899	57,450	86.0	11.00	78.0	14.10	119.8
1900	53,231	92.6	12.31	78.9	15.60	110.6
1901	55,819	104.9	12.92	81.3	15.89	101.9
1902	65,296	117.0	12.83	86.7	14.79	93.1
1903	68,154	104.4	11.69	84.8	13.78	93.1
1904	69,192	101.5	11.50	86.1	13.36	96.9
1905	72,973	105.5	11.20	86.7	12.92	96.7
1906	66,341	90.9	15.87	91.2	17.40	134.7
1907	72,261	108.9	15.14	91.6	16.53	95.0
1908	78,440	108.5	12.04	93.0	12.95	78.3
1909	74,384	94.8	15.34	101.6	15.10	116.6
1910	69,378	93.3	18.24	95.2	19.16	126.9
1911	54,916	79.1	21.77	96.0	22.68	118.4
1912	72,691	132.4	16.77	100.1	16.75	73.8
1913	64,116	88.2	16.38	99.0	16.55	98.8
1914	70,071	109.3	15.93	99.8	16.12	97.4
1915	85,920	122.6	17.12	110.5	15.49	96.1
1916	91,192	106.1	16.58	151.8	10.92	70.5
1917	83,308	91.3	24.99	186.7	13.39	122.5
1918	76,660	92.0	31.67	199.9	15.84	118.3
1919	86,359	112.6	35.01	227.0	15.42	97.4
1920	87,855	101.7	28.80	183.8	15.67	101.6
1921	82,458	93.8	23.29	142.3	16.37	104.4
1922	95,748	116.1	21.97	155.7	14.11	86.2
1923	89,250	93.2	25.79	150.3	17.16	121.6
1924	98,086	109.9	22.84	154.8	14.76	86.0
1925	86,474	88.2	24.60	155.7	15.80	107.1

[1]Production figures are those given in the Yearbooks of the Department of Agriculture. Prices are averages for crop years running from July to June. Thus the entry for 1890 is an average of the prices prevailing during the 12 months, July, 1890, to June, 1891.

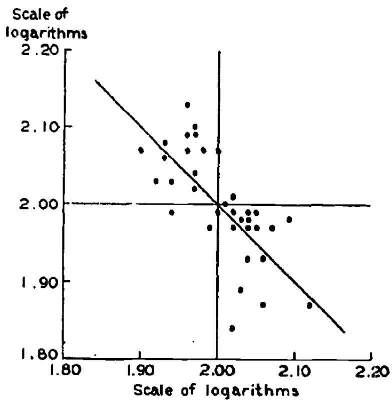
of correlation (between logarithms of link relatives of prices and production) has a value of —.73, with a probable error of .054. There is here a fair degree of correlation.

The coefficient of determination, which is equal to .53, may be interpreted in this fashion: On the assumption that there is a causal relation between fluctuations in the price of hay and variations in the total amount produced, we may say that 53 per cent of

FIGURE 8

DIAGRAM SHOWING THE RELATION BETWEEN THE WHOLESALE PRICES OF TAME HAY AND THE TOTAL PRODUCTION OF TAME HAY IN THE UNITED STATES.

Logarithms of Link Relatives of Deflated Prices (Crop Years) and of Production, 1890-1925, with Line of Average Relationship.*



*The equation to the line is: log Y = 3.93434 -.96454 log X. Prices are plotted on the vertical axis.

the variability of price is due to variation in production, variability being here measured in terms of the standard deviation squared. The remaining variability, 47 per cent of the original squared variability, is due to other factors which have not been included in the present analysis.[1]

[1]If we represent by σ^2_y the squared variability of the original observations on the dependent variable, by S^2_y (the square of the standard error of estimate) the squared variability which remains to be explained after account has been taken of the influence of the independent variable, and by $\sigma^2_{y'}$ the square of the standard deviation of the computed values of the dependent variable (i. e. the *y*-values of those points on the line of regression which correspond to the actual observations), it may be shown that $\sigma_y^2=\sigma^2_{y'}+S_y^2$. (For a proof of this relationship see B. B. Smith, *Correlation Theory and Method Applied to Agricultural Research*, a mimeographed publication of the U. S. Bureau of Agricultural Economics.) The coefficient of determination may be derived from the relationship

$$d_{yx}=\frac{\sigma^2_{y'}}{\sigma^2_y}$$

(Footnote continued on next page.)

3. Relation Between the Price and Per Capita Consumption of Potatoes in the United States

Another illustration, which affords an example of a commodity which is very flexible in price, is furnished by the following data.

TABLE 51

Prices and Estimated Per Capita Consumption of Potatoes in the United States, 1890-1913 (crop years)[1]

(1) Year	(2) Estimated consumption, U. S. (in millions of bushels)	(3) Per capita consumption (in bushels)	(4) Link rel. of per capita consumption	(5) Wholesale price per bushel, crop year average	(6) Link rel. of wholesale price
1890	155.5	2.47		$.923	
1891	255.7	3.97	160.7	.326	35.3
1892	168.0	2.56	64.5	.717	219.8
1893	197.2	2.94	114.8	.588	82.0
1894	184.6	2.70	91.8	.596	101.3
1895	316.6	4.55	168.5	.203	34.0
1896	271.1	3.82	83.9	.224	110.5
1897	191.6	2.65	69.4	.584	260.9
1898	218.7	2.97	112.1	.411	70.4
1899	259.6	3.47	116.8	.370	90.0
1900	247.4	3.25	93.6	.384	103.7
1901	205.7	2.64	81.2	.750	195.2
1902	293.4	3.70	140.1	.435	58.0
1903	264.7	3.27	88.4	.811	186.4
1904	351.3	4.25	130.0	.315	38.8
1905	279.8	3.32	78.1	.565	179.5
1906	330.3	3.85	116.0	.457	80.9
1907	322.1	3.68	95.6	.614	134.2
1908	309.6	3.47	94.3	.786	128.0
1909	393.9	4.34	125.1	.376	47.8
1910	346.9	3.76	86.6	.484	128.8
1911	305.2	3.26	86.7	1.025	211.7
1912	418.9	4.40	135.0	.491	47.9
1913	333.4	3.45	78.4	.654	133.3

[1]Total consumption has been estimated by adding to the total U. S. production during a given year all imports during the fiscal year ending June 30th following, and subtracting all exports during the same fiscal year.

The wholesale prices employed are those quoted by the U. S. Bureau of Labor Statistics for "ordinary to fancy" white potatoes. Crop year averages are based upon monthly prices, from September to May.

It is clear from this formula that this coefficient measures the proportionate relationship between the squared variability of the computed values (i. e. the variability which has been accounted for) and the squared variability of the original observations. That d_{yx} is equal to r^2_{yx} may be readily demonstrated from the following relationships:

$$\sigma^2_y = \sigma^2_{y'} + S^2_y$$

$$r^2 = 1 - \frac{S^2_y}{\sigma^2_y}$$

In the present problem the various measures of squared variability, in logarithmic form, have the following values:

$$\sigma^2_{\log y} = .00456009$$
$$\sigma^2_{\log y'} = .00215574$$
$$S^2_{\log y} = .00240435$$

The prices employed are those given in the wholesale price bulletins of the Bureau of Labor Statistics. The quotations are drawn from the Chicago market. These have been averaged by crop years (September to May).[1] Since changes in the price level were not so pronounced over the period here covered as they were during the period to which the preceding example related, and since deflation by a general index of wholesale prices furnishes only an approximation to the desired result, no attempt has been made to deflate these prices.

The link relatives are plotted in Figure 9, together with the graph of an equation describing the average relation between prices and production. The basic measures appear below. The symbol Y represents the link relatives of prices and X represents the link relatives of per capita consumption.

Equation of relationship: $\log Y = 6.43050 - 2.21193 \log X$
Standard error of estimate in logarithmic form = .09022
Standard error of estimate in percentage form = 20.9
Coefficient of correlation = —.938
Coefficient of determination = .8808
Coefficient of price flexibility = —2.21

The standard deviation of the logarithms of the price relatives, which may be compared with the standard error of estimate, is .26128 (in percentage form, 63.8).

During the period 1890-1913 there appears to have been a fairly close relation between the per capita consumption and the wholesale price of potatoes. The coefficient of determination has the relatively high value of .88. We may interpret this in the usual fashion, remembering that the consumption figures represent, in fact, potato production, corrected for imports and exports and for changes in the total population.

The demand for potatoes appears to be quite inelastic ($\eta = -.45$, approximately),[2] while the price is very flexible ($\phi = -2.21$). In

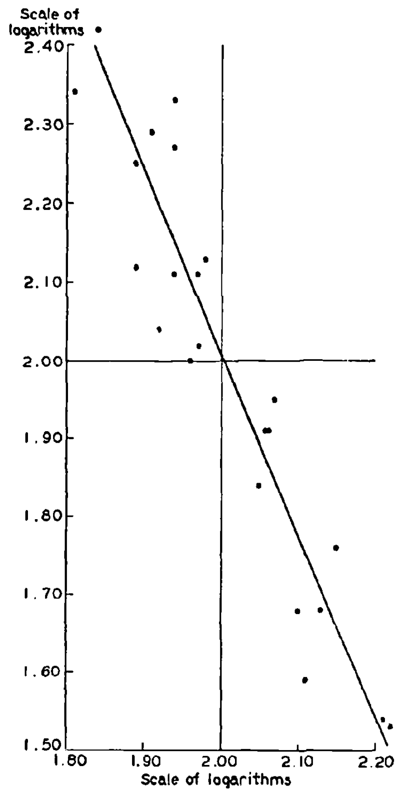
[1]The estimates of per capita consumption are, of course, only approximations. No account has been taken of loss in storage, which in some years may be considerable. For a detailed discussion of this general subject see "Factors Affecting the Price of Minnesota Potatoes," by Holbrook Working (*Technical Bulletin No. 29*, University of Minnesota, Agricultural Experiment Station). It is probable that the absolute production figures used in making these estimates were affected somewhat by a change in the basis for estimating yield per acre, in 1902. (See Working, p. 18.) By the use of link relatives the disturbing effect of such a change is restricted to one year, when the new method was put into operation.

[2]Holbrook Working, in his comprehensive study of the demand for potatoes, has expressed the relationship between price and consumption by means of another function,

FIGURE 9

DIAGRAM SHOWING THE RELATION BETWEEN THE WHOLESALE PRICES OF POTATOES IN CHICAGO AND THE PER CAPITA CONSUMPTION OF POTATOES IN THE UNITED STATES.

Logarithms of Link Relatives of Actual Prices (Crop Years) and of Per Capita Consumption, 1890-1913, with Line of Average Relationship.[1]



[1]The equation to the line is: log Y = 6.43050 − 2.21193 log X. Prices are plotted on the vertical axis.

this respect potatoes differ significantly from hay, which was treated above.

One important precaution should be mentioned in thus setting up for comparison the measures which have just been secured. The

which gives varying elasticities of demand. His values for η range from .36 at the highest prices to .49 in the middle ranges and .57 at the lowest prices. His price data are drawn from the St. Paul market, a different period is covered, and the original price and consumption data are modified, before correlating, by a method quite different from that followed here. The correlation between his corrected price and consumption data is given as .972. ("The Statistical Determination of Demand Curves," *Quarterly Journal of Economics*, August, 1925, pp. 503-543.)

immediate object of the present investigation is not the study of price-making forces which affect individual commodities, but the derivation of a set of measures relating to the characteristics of specific commodity prices and capable of comparison and combination with similar measures relating to other commodities. The emphasis throughout has been on such comparisons. Of the measures discussed above in surveying relations between prices and quantities, three are abstract coefficients which would appear to be suitable for this purpose. These are the coefficients of correlation, determination and flexibility.

The use of these coefficients in making comparisons and in forming combinations introduces difficulties which were not encountered in using the measures described in earlier sections. Each of the earlier measures—of variability, trend, cyclical behavior—described a characteristic of a given price series, considered by itself. But the values of the coefficients of correlation, determination and flexibility depend upon the relations between given price series and quantity series. If the coefficients relating to different commodities are to be compared we must be sure not only that the price series used are comparable, but that the quantity series employed are also comparable, and that the technical methods, by which the original price and quantity series have been adjusted and combined, permit valid comparison of the results. The conditions which would insure perfect comparability are difficult to secure and, accordingly, comparisons of coefficients of flexibility of price and elasticity of demand (and of the related measures discussed above) must always be made with great caution.[1]

VI Relations Among Commodity Price Characteristics

In the preceding sections there have been presented a number of measures descriptive of the behavior of individual commodity prices. It is of interest to determine whether the characteristics

[1]E. J. Working after analyzing the conditions which affect the significance of a statistical demand or supply curve, suggests four points upon which information must be had before such a curve may be properly interpreted. These points concern (1) the relative variability of supply or demand curves in a given instance (Working means, by the variability of a supply or demand curve, tendency to shift back and forth from time to time), (2) the market to which the price and quantity data refer, (3) the extent to which "other things are held equal," and (4) the presence or absence of correlation between the shifting of supply and demand curves. Although the statistical significance of all these points has not been fully determined, Working's general discussion, and his emphasis upon a knowledge of all relevant details in interpreting results secured in this field, bear immediately upon the subject of price flexibility, which is the object of our present concern. (See "What do Statistical 'Demand Curves' Show?", E. J. Working, *Quarterly Journal of Economics*, February, 1927, pp. 212-235.)