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Volume Author/Editor: Frederick C. Mills

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Chapter Author: Frederick C. Mills

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mean. The other distributions are somewhat less symmetrical, but in no case do we get the extreme skewness found in the distributions of price relatives and in the distributions relating to monthly variability.

In one other respect these distributions differ significantly from most of those previously studied. Four of the eight distributions in this group are flat-topped (i. e. the measures of kurtosis are negative). In each of these four distributions (which relate to duration of rise, percentage of rise, percentage of fall and degree of cyclical variability) there is less concentration in the neighborhood of the mode than there is in a corresponding normal distribution. Most of the distributions secured by combining measures of price behavior are characteristically peaked.

As in the case of the other distributions represented by points in Figure 57, the present group contains no examples of heterotypic distributions. There is no evidence here of the presence of those presumably disruptive elements which carry a distribution into the heterotypic area. The contrast between these distributions and the distributions of fixed base and link relatives which were presented in Chapter III is apparent.[1]

III Summary

1. In investigating the behavior of prices in combination all the measures descriptive of the behavior of individual commodities have been combined in the form of frequency distributions. The third chapter dealt with price relatives in combination. Characteristics of combinations of the other measures described in earlier sections are discussed in the fourth chapter.

2. Distributions of measures of monthly price variability show a heavy concentration of frequencies at the lower end of the scale, a condition which indicates a relatively low degree of variability for the great bulk of commodities. A small number of commodities, however, are marked by extremely high price variability. The presence of these two elements—markedly stable and highly variable commodities—is reflected in many of the distributions made up of measures of price behavior, and accounts for certain important attributes of the system of prices.

[1]It should be noted that the two sets of distributions are not fully comparable. The distributions of cyclical measures include a great many more observations, since they are drawn from all periods, and for this reason would be expected to have somewhat more stable characteristics. Again, the distributions of cyclical measures are based upon a selected list of commodities, certain ones being excluded because they are classed as exceptional, or because they did not reflect in their price movements the major cyclical swings of general business. Perhaps more important than these limitations is the fact that the rules governing the derivation of the individual cyclical measures (see pp. 76-82, 89-90) are in some respects arbitrary, whereas the price relatives are derived by a purely objective process. Finally, measures of cyclical movements have been secured only for those commodities which share in specific cycles. Those which fail to conform are of necessity excluded from the compilation, although account has been taken of them elsewhere.

3. The study of measures of monthly price variability reveals that the amplitude of the fluctuations of commodity prices, viewed collectively, does not ordinarily vary greatly from one year to the next. The host of cyclical and other factors affecting the prices of individual commodities exert a continuous influence. During the violent disturbances of the war and post-war years, however, the values of the annual averages of measures of monthly variability were materially increased.

4. During the period 1890-1913 there was a secular decline in the monthly variability of commodity prices at wholesale in the United States.

5. The distributions of measures of frequency of price change show curious concentrations at the upper and lower ends of the scale. Most commodities change in price very seldom or very frequently. A relatively small number fall in the middle ranges of the scale of frequency of change.

6. Prices of the large bulk of commodities at wholesale are affected to some extent during general business revivals and recessions. The following figures, based upon the total number of cyclical movements recorded in 209 commodity price series during ten business cycles (including 11 periods of revival and 10 of recession), indicate the degree to which general business cycles are reflected in wholesale commodity markets.[1]

Object of observation	Total number of observations on individual commodities	Number showing price turns conforming to prevailing cyclical movements	Percentage showing price turns conforming to prevailing cyclical movements
Behavior during revival	2299	1832	79.7
Behavior during recession	2090	1623	77.7
Behavior during successive phases of revival and recession	2090	1485	71.1

The number of commodities sharing in business revivals has constituted, on the average, 79.7 per cent of the commodities studied in specific cycles. This proportion has fluctuated, from cycle to cycle during the period since 1890, between 67 per cent and 95 per cent.

[1]In securing the figures upon which these entries are based, no attempt was made to isolate cyclical movements from secular, seasonal and accidental changes. Account was taken of any distinct upward or downward price swing which appeared to be connected with prevailing cyclical movements.

The proportion affected by general price recessions has averaged 77.7 per cent, and has ranged in different cycles, between 70 per cent and 95 per cent.

The number of commodities classed as passing through a complete cycle (i. e. experiencing cyclical turns during successive phases of revival and recession) has constituted, on the average, 71.1 per cent of the commodities studied. The proportion has varied, from cycle to cycle, between 65 per cent and 78 per cent of the total.

7. Measures relating to eight aspects of price behavior during each of ten business cycles occurring between 1890 and 1925 have been combined in frequency distributions, and measures of central tendency and variation have been computed for each of these distributions. The detailed information concerning the group behavior of commodity prices during business cycles which these measures yield may not be readily summarized. A few of the points revealed by a study of these distributions are noted in the following paragraphs.

a. The majority of commodities turn upward in price during revival within a twelve-month interval which extends from 1.5 months before the date of the up-turn in the index of wholesale prices to 10.5 months after that date. The characteristics of the distributions relating to the timing of revival in the prices of individual commodities differ materially from cycle to cycle, however.

b. The period of greatest concentration during recession extends from 4.5 months before the date of the down-turn in the wholesale price index to 7.5 months after that date.

As in the case of revival, the character of the distribution of measures relating to the timing of price decline indicates that many forces are affecting prices during such a movement, and that these forces vary in intensity with the passage of time. During recession there is a steady cumulative gain in the intensity of these forces until the flood of falling prices has reached its maximum volume. Then comes a decline in intensity, a regular subsidence which is almost perfectly symmetrical with the preceding increase.

The distributions relating to different periods of recession vary materially in respect to the location of their central tendencies, and in degree of dispersion.

c. For both revival and recession the mean date of turn secured by averaging the measures relating to individual

commodities comes after the date of turn in the general index of wholesale prices. The averages for all periods show a mean date of turn following the general price index by 2.6 months on revival and by 1.0 month on recession. There is an indication here that the cyclical turns in the price index are in general due to changes in the prices of a relatively small number of commodities which move in advance of the bulk of commodities at such times.

d. The degree of variation from the mean date of turn varies from cycle to cycle, in respect to both revival and recession, but the variation is in general greater during revival than during recession. The standard deviation of 1110 measures relating to the timing of price revival is 9.6 months. The corresponding measure for price recession is 8.4 months. The decline in prices which occurs in the wholesale markets of the country at a time of recession is a more concentrated and uniform movement, it appears, than is the rise of prices during revival.

e. The downward movements of commodity prices are shorter on the average, than the up-swings (17 months, as compared with 22.2 months). The recessions are also more compact, in respect to duration, than are the upward movements. The standard deviation of 1110 measures relating to duration of periods of price fall is 9.6 months, as compared with 13.3 months for the same number of measures relating to the duration of periods of price rise.

f. During the period since 1890 the average increase of commodity prices at wholesale during revival has exceeded the average decline during recession, a natural accompaniment, of course, of the upward trend of prices during this period. Expressing both increase and decrease as percentages of the high values recorded during specific cyclical movements, the most common (i. e. the modal) increase during revivals in this period was 21.5 per cent, and the most common (modal) decline was 15 per cent. (The modal increase was approximately 27 per cent of the low price in each cycle.)

The mean increase during revival, expressed as a percentage of the high value, was 32.8 per cent, and the mean decline, on the same base, was 28.9 per cent. (When the base of the percentages is the average of low and high

prices in each cycle, these two means become approximately 39 per cent and 34 per cent.)

g. The average length of cycles in the prices of individual commodities at wholesale during the period since 1890 has been 39.2 months. For specific cycles the average has varied from 31.1 months to 50.0 months. Within each cycle there are material differences between individual commodities in respect to the duration of cyclical swings.

h. The average amplitude of cyclical price swings during the period since 1890 is measured by an index of 30.8. (This index is computed from percentages based upon the high values in specific cycles.) This represents a swing from low to high (and from high to low) equal to about 37 per cent of the average of low and high values. The variation from cycle to cycle in respect to the amplitude of price movements is not marked under ordinary conditions. Only during the violent disturbances between 1914 and 1922 was the amplitude of cyclical price fluctuations materially increased.

8. A detailed study of the movements of individual price series shows that the cycles which are discernible in the movements of a general price index are the net resultants of a host of widely different movements in the prices of individual commodities. The prices of some commodities do not conform to general business cycles at all. Those commodities that do reflect a general cycle in their price movements differ materially among themselves in respect to the timing of revival and recession and in the duration and amplitude of their cyclical swings. Cycles in commodity prices appear as broad tendencies among varied movements. In attempting, in this analysis, to trace and to measure some of these tendencies, they have been shown against the background of diverse and complicated price fluctuations which constitute a continuing element in the economic situation. It is an advantage, as it is also, perhaps, a defect, of this procedure that the diversities are retained, and presented in the final picture.

The immediate objectives of the present study are the development of a method of analysis and the accumulation of a body of facts which may conduce to an understanding of the price system.

This volume has dealt with the following aspects of the general problem:

1. The behavior of the prices of individual commodities, and the relations among different attributes of commodity prices.
2. Regional differences between commodity prices, and differences from market to market in the behavior of prices of individual commodities.
3. Certain problems related to the measurement of changes in the general level of wholesale prices.
4. The measurement and significance of price dispersion and of price displacement.
5. The effect of changes in the price level upon relations among the prices of individual commodities.
6. The characteristics of the population of prices, as revealed by the behavior, in combination, of price relatives and of measures of variability, trends and cyclical movements in the prices of individual commodities.

No attempt has been made, in presenting the results of this study, to support a specific thesis. The investigation has been looked upon as part of a general attack upon the problem of charting the price system, defining its elements, tracing the connections between these elements, determining the nature of the changes which occur in the price system with the passage of time and with changes in general economic conditions, and of describing more exactly the part which the system of prices plays in economic processes. This view of the relation of the present study to the broad task of surveying the price system has conditioned the plans for the investigation and has determined the form in which the results appear.

In concluding the account of the first part of this study, attention may be drawn to two significant facts. One is the existence of wide diversities in the behavior of the prices of individual commodities. This is true in respect to every type of behavior dealt with in the preceding pages. To the economist whose interest lies in changes in the purchasing power of the monetary unit such diversities present themselves as troublesome complications. For in the multiplicity of divergent fluctuations he seeks to measure a central tendency, to trace the effects of a single factor. But, as so often has been the case in the history of science, the phenomena which appear merely as irrelevant and irritating complexities to

one generation of research workers become, to another generation, the means of solving old problems and of discovering new laws. There lie here, ready to the economist's hand, materials from which new knowledge may be gleaned.

The second fact of importance is the existence, among the diversity of price movements, of just those uniformities for which the scientist searches in attempting to reduce masses of facts to understandable terms. The present investigation and those which have preceded it in this field have gone only a little way in the search for principles of order among the variations within the price system, but there have been revealed numerous interrelations and uniformities, and there have been found many clues to other regularities. In the existence of these regularities lies our hope of achieving a fuller understanding of the working of the system of prices.