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〈 CHAPTER 6 〉

SUMMARY

IN this study we are investigating the interactions of commodity prices and physical quantities during cycles in general business, and cyclical fluctuations in the monetary outlays of buyers (and the revenues of sellers) of commodities. Our first concern is with the mechanism by which demand and supply of individual commodities are kept in some kind of equilibrium as the business system passes through alternating phases of cyclical expansion and contraction. We are seeking to define patterns of behavior characteristic of the markets for individual commodities and for major classes of commodities as these markets react to the pressures of cyclical change. Secondly, we are concerned with the flows and ebbs of monetary payments for commodities, individually and in the aggregate, during cycles in general business. Changes in the monetary stream reflect variations in the number of physical units exchanged and shifts in unit prices, but these two factors differ greatly in relative importance from area to area of economic activity. We are interested, therefore, not only in the patterns of variation in monetary payments in various markets, but also in the relative roles of price and physical volume as factors in cyclical changes in buyers' outlays and sellers' revenues.

Interactions of Unit Prices and Quantities in Business Cycles

1) About five-sixths of all the commodities studied are marked by persistent and significant patterns of behavior, in the combined movements of prices and quantities during cycles in general business.

2) There is extraordinary diversity among commodities in the magnitude of the variation of prices and quantities. The combined variability of prices and quantities for coke, at one extreme, is 69 times that of flour, at the other.

3) There is equally wide diversity in the relative importance of the price and quantity components. The price contribution to the combined variability ranges from 1 percent of the total,

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for iron ore and passenger automobiles, to 98 percent, for crude petroleum and potatoes.

4) Prices participate in business cycles more extensively than quantities, when the criterion is direction of movement. This is true of both expansion and contraction, but more notably of contraction. Physical volume reverses the cyclical push more frequently than price. This contracyclical movement of quantity series is strongest during business contractions, when secular pressures often more than offset cyclical influences.

5) In magnitude of relative movement, the net effect of business expansion is to raise quantities more than prices; the net effect of business contraction is to reduce prices more than quantities. (Trend factors in both volume and price play parts here, of course. We are dealing with the combined effects of cyclical movements and intracycle trends.) Various measures of the degree to which these two factors respond to cyclical forces indicate that quantities are more sensitive to pressures of expansion, prices to those of contraction. The brakes to expansion seem to be stronger for prices than for quantities; the brakes to contraction seem to be stronger for quantities than for prices. (These are over-all statements, concerning the aggregate of all commodities here studied. Groups vary widely in this respect.)

6) Measures of the full cycle elasticity of quantities and the flexibility of unit prices (for explanation of the technical meanings of these terms see Ch. 2) are positive for 44 of the 64 commodities studied. In other words, inverse relations between quantities and unit prices characterize only about 30 percent of these commodities when market behavior is studied in the framework of reference cycles. For most commodities the cyclical pressures making for concurrent increases in prices and quantities, and for concurrent declines, override such market tendencies as may make for inverse movements of prices and quantities. In the price-quantity relations of business cycles the patterns of static theory are subordinated to dynamic forces that bring changes in the position and shape of demand and supply curves. Diversity in the relative responsiveness of quantities and prices to cyclical forces is revealed by measures of

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price flexibility (full cycle) ranging from values very close to zero for passenger automobiles and iron ore, to +50 for meat and -50 for potatoes.

7) In the average pattern of cyclical behavior, for all 64 commodities, physical quantities show a slight advance in the terminal period of general business contraction (between stages VIII and IX) when prices are still sagging. The average rate of advance in quantities exceeds that in prices for all periods up to the reference peak at stage V, except during the characteristic retardation that occurs between stages II and III. In contraction the initial fall in quantities (between stages V and VI) is more rapid than in prices. In all subsequent stages of contraction prices decline more sharply.

8) This same average pattern, for all commodities, yields coefficients of quantity elasticity and price flexibility for the full cycle that differ but slightly ($e=+1.01$; $f=+0.99$). Notable, however, are the markedly lower elasticity of quantities and the markedly higher flexibility of prices in the contraction phase of reference cycles, as compared with measures for expansion. Measures for the separate interstage periods reveal progressive increases in the sensitivity of quantities as general business expansion spreads after reference cycle stage III. (Retardation between stages II and III is marked by a sharp drop in the elasticity of quantities, a sharp advance in the flexibility of prices.) In the middle and terminal phases of contraction we find, conversely, progressive increases in the flexibility of unit prices.

9) Commodity groups differ greatly in the combined cyclical variability of prices and quantities. The average joint variability of metals is seven times that of consumer goods. In general, durable goods, capital equipment, and nonfarm products show high joint variability, while consumer goods, foods, farm products, and nondurables show low variability.

10) Among commodity groups the contribution of the price factor to the combined variability of prices and quantities ranges from 16 percent for durable goods to 96 percent for crop products. Price variability is high, relative to variability of quantities, in markets close to the initial stage of extraction

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and in markets close to the final stage of consumption. Relative stability of output of many primary products (for which supply cannot be altered on short notice on the basis of market prospects) places the chief burden of cyclical adaptation on prices. Relative stability of consumption, especially of nondurable goods, plays a similar role at the terminal stage of the distributive process. In the intermediate markets, especially those for durable goods, capital equipment, and nonfarm products, prices are more stable, and quantity variations reflect mainly the play of cyclical forces.

11) An outstanding characteristic of the 16 commodity groups we have studied is their relative homogeneity in the magnitude of their price variability (crop products, at one extreme, are slightly more than twice as variable as consumer goods, at the other); their extraordinary heterogeneity in variability of physical quantities (the measure for metals, the most variable, is 144 times that for foods, the most stable). This difference is the more notable in that the price and quantity averages for all commodities are fairly close, the price average being slightly higher. Ties among the elements of the price system, making for uniformity of response to cyclical forces, are far closer than those among physical quantities.

12) Group measures of quantity elasticity and price flexibility during the full cycle cover a wide range. For durable goods the flexibility of prices is measured by a coefficient of .43; for foods the coefficient is .50. All measures are positive. The grouping process gives predominance to the cyclical forces that make for concurrent advances, or concurrent declines, in prices and quantities. Flexible prices (and inelastic quantities) are found among farm products, nondurable goods, consumption goods of all sorts, and raw materials; inflexible prices (and elastic quantities) characterize their counterparts—nonfarm products, durable goods, capital goods, and manufactured goods. We find among the separate groups, as we did for the aggregate of all commodities, a characteristic decline in quantity elasticity (and an increase in price flexibility) as expansion gives way to contraction.

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Patterns of Buyers' Outlays and Sellers' Revenues in Business Cycles: Aggregative

13) The amplitudes of fluctuations in quantities and in average unit prices, in reference cycles, are about equal (amplitude indexes of 40). The corresponding cyclical swings in buyers' outlays are twice as great (amplitude index of 80). These relations result from the fact that cyclical variation in unit prices and in quantities reenforce each other, being roughly concurrent and in the same direction. The impress of business cycles upon the stream of monetary payments is thus accentuated.

14) The rate of increase in buyers' outlays is highest during the first period of general expansion (between reference cycle stages I and II). A definite check is experienced after stage II, followed by a steady advance that continues to the peak of general business at stage V. A sharp reversal of movement comes at stage V, the decline is accelerated after stage VI, and slightly retarded after stage VII. In the final period of contraction there is virtual stagnation of buyers' outlays for one whole interstage period, in contrast to the immediate reversal that comes as the peak of expansion is passed.

15) Monetary payments, viewed in detail and at all stages of business cycles, move in general with the tide of business at large. Of the aggregate of interstage changes in payments for individual commodities, just two-thirds are with the cyclical tide, one-third against (the proportion of movements with the tide is slightly higher than this in expansion, slightly lower in contraction). The nature of business cycles, as preponderant tendencies toward expansion or contraction, rather than completely uniform advances or declines, is manifest in this overall record.

16) At any stage of a business cycle monetary payments will be increasing for some commodities, decreasing for others. The proportion of transactions involving increases in buyers' outlays is at a minimum between reference cycle stages VI and VIII, when outlays were increasing for about one-sixth of all commodities studied. (The reference is to the average behavior of individual commodities.) Outlays were declining for the

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other five-sixths. Between stages VIII and IX the tide is still receding, but the ebb runs far less strongly. Buyers are increasing their outlays for 45 percent of all commodities. During reference expansion, between stages I and V, outlays are increasing for 80 percent or more of all commodities, except during the brief period of retardation after stage II. Between stages III and IV, when 89 percent of all outlay changes are positive, the stream of monetary payments is running more uniformly in one direction than it is at any other period of the cycle. The reversal after stage V brings a sharper shift than did the counter-reversal at the cyclical trough. Here, in respect of the scope of the cyclical movement, the story is the same as for the rate of movement. Transition from expansion to contraction is a sharp, quick change; that from contraction to expansion is slower, and more protracted.

17) Quantity changes are chiefly responsible for the cyclical expansions and contractions in monetary payments between buyers and sellers of commodities. In 58 percent of more than four thousand interstage changes in buyers' outlays quantity is the dominant factor in determining the direction and amount of the observed movement of monetary values. Price was dominant in the other 42 percent.

18) In each of the four periods between stages I and V of reference expansions increases in physical quantity are the dominant factor in about 60 percent of all outlay increases. Only between stages V and VI, after the peak of business expansion, does price become more important than quantity as a boosting factor among the small minority of goods for which outlays are still increasing. The dominance of quantity in making for increases in monetary payments is high in the final period of general business contraction when it works to reverse the prevalent decline in buyers' outlays and sellers' revenues.

19) As a factor depressing monetary outlays quantity is strongest, relatively, when the cyclical tide is turning between stages IV and VI, and in the check to expansion between stages II and III. This temporary retardation seems to be primarily a physical phenomenon. Price as a depressant is strongest in the middle period of contraction, between stages VI and VIII.

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20) In summary of the aggregative record, the evidence examined indicates that the force of expanding volume in the physical quantity of goods produced and exchanged is dominant in braking the decline in buyers' outlays and sellers' revenues in the final stages of business contraction; that quantity declines interrupt the general advance after stage II and play a leading role in the generation of recession; that prices follow the leader in expansion, turn downward with quantities after the peak of business activity has been passed (but work in an appreciable minority of cases to keep monetary payments rising during the first stage of general business contraction), and push strongly to reenforce contraction in the stream of monetary payments.

Patterns of Buyers' Outlays and Sellers' Revenues in Business Cycles: Commodity Groups

21) The 16 commodity groups here studied are alike in that buyers' outlays reach a maximum at stage V of reference cycles, and decline thereafter. At reference cycle troughs there is greater divergence. For 5 groups (farm products, crop products, consumer goods, foods, and nondurable goods) buyers' outlays begin to expand after stage VIII. For 3 groups (raw materials, animal products, and goods intended for human consumption) outlays are constant between stages VIII and IX. For the other 8 groups they reach a minimum at stage IX.

22) Differences among groups in amplitude of outlay fluctuations are much greater than are differences in timing. Fluctuations of buyers' outlays in business cycles are narrowest for foods, consumer goods, farm products, and nondurables; they are widest for metals, durables, and goods for capital equipment. In general, group differences in amplitude of outlay fluctuations are closely correlated with group differences in amplitude of cyclical swings in physical volume. The relative uniformity of price changes previously noted is characteristic of these commodity groups. Differences in the susceptibility of quantities to cyclical forces are the chief factors making for differences in the cyclical amplitudes of buyers' outlays.

23) Buyers' outlays for foods increase most rapidly in the

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terminal period of general business contraction (between stages VIII and IX of reference cycles). For nearly all other groups (13 of the 16) rates of advancing outlays are highest in the first period of reference expansion (between stages I and II). For the broad class of consumer goods the maximum rate of advance comes midway in the general period of expansion (between stages III and IV). Foods and consumer goods generally attain maximum rates of increase in physical quantities in the final period of reference contraction (between stages VIII and IX). This early physical recovery in the consumer sector of the economy is a significant aspect of the transition from contraction to expansion in the economy at large.

24) The sharpest accelerations in outlays are chiefly attributable to increases in the physical volume of purchases. For four groups only (farm products, crop products, producer goods for human consumption, and nondurables), goods for which supply does not respond promptly to the stimulus of new demand, were price increases the chief factors in these maximum rates.

25) For all groups except animal products and foods maximum rates of decline in buyers' outlays are greater than maximum rates of advance.

26) Maximum rates of decline in buyers' outlays come for most commodity groups in the second period of general business contraction (between stages VI and VII). There is, thus, acceleration of decline from the first to the second period of recession, in contrast to the characteristic retardation of advance during expansion. Exceptions to the early acceleration in contraction are found among manufactured goods, crop products, and farm products generally, for which outlay declines are most intense in the first period of business decline. For consumer goods acceleration continues to a maximum decline in buyers' outlays between reference cycle stages VII and VIII.

27) The maximum rates of decline in quantities differ but slightly from maximum rates of advance for most commodity groups. Rates of price decline that exceed rates of price advance are largely responsible for rates of decline in buyers' outlays that exceed corresponding rates of advance. These price de-

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clines, we have noted, are marked by acceleration at least through the second period of contraction, and for some groups through the third period—acceleration that stands in notable contrast to the retardation characteristic of price advances during business expansions.

28) Buyers' outlays for all classes of goods follow the tides of expansion and contraction in business at large, but the extent of concordance varies somewhat from group to group. For metals, durable goods, capital equipment, and nonagricultural products about three-quarters of all interstage movements of buyers' outlays accord with the cyclical movements of general business. The proportion falls to about three-fifths for the groups of goods least subservient to the forces of business cycles—consumer goods, farm products, and nondurable goods. The range of difference is not wide. The impressive feature is that from 60 to 75 percent of the interstage movements of monetary payments for goods of the many varieties here distinguished accord with the swings of business cycles. Group differences in this respect are less during contraction than during expansion. There is greater diversity of business fortunes, and of buyers' behavior, during business expansions than during contractions.

29) From a study of the order and the extent to which outlays of buyers for different kinds of goods pick up after contraction and depression, and decline after expansion and prosperity, the following conclusions emerge:

a) Between reference cycle stages VI and VIII, when the proportion of commodities marked by increasing outlays is at a minimum (about one-sixth of the commodities studied) the extent of the participation in the advance is below the general average for the products of heavy industries and for producer goods in general, above the general average for farm products, consumer goods, and nondurables.

b) In the final period of business contraction (between stages VIII and IX) declines in buyers' outlays still exceed advances, but the proportion of commodities for which buyers' outlays are expanding increases among all groups. In each of six categories—human consumption goods, consumer goods, nondurables, farm products, foods, and crop products—more than half

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of the commodities are marked by expanding monetary payments. The groups that take the lead in contributing to a business upturn in the terminal stages of general business recession are farm products and goods in shape for final purchase by consumers. In the primary farm markets and in the markets for finished consumer goods the forces of recovery are manifest while the tide of business at large is still ebbing.

c) The wide diversity of forces affecting business in the terminal period of cyclical contraction is evidenced by a range extending from 13 (the percentage of metals for which buyers' outlays increase) to 92 (the corresponding percentage of crop products).

d) Although rising demand for consumer goods and increasing revenues of farmers may play important roles in checking contraction and initiating recovery, the lead is quickly taken by other groups once the tide has turned. The striking shift in the spectrum of buyers' outlays as the trough of depression is passed is a notable feature of the present evidence. Durable goods and metals, least active positively between reference cycle stages VIII and IX, participate most completely in recovery between stages I and II, while consumer goods, crop products, and foods are lowest in percentage of outlay increases, once the turn has been rounded. This extraordinary reversal, as the center of business activity shifts from the farm and consumer sectors to the industrial, manufacturing, and producer goods sectors, is an obvious manifestation of a change in the business weather. It is no accident that business annals and the quantitative records of business activity place the upturn in business fortunes at the stage where this shift occurs.

e) The characteristic retardation of business expansion after reference stage II is reflected in 15 of the 16 commodity groups studied. This check is most marked among goods in the consumption, nondurable categories, goods much less subject to fluctuations during the full cycle than are products of heavy industry. Among the nondurables and consumption goods this early retardation is more pronounced at the manufacturing, producer goods stages than in the markets for finished consumer goods. The swing back after stage III is most marked, also,

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among manufactured goods and among the generally less sensitive consumption goods, nondurables, foods, and farm products.

f) Expanding activity is most pervasively characteristic of the economy between reference cycle stages III and IV. Not only is the percentage of participation in the expansion at a maximum, for all commodities studied, but the range of group differences, in percentage of commodities marked by increasing buyers' outlays, is at a minimum. This is a period of concerted, general advance in aggregate monetary payments for commodities.

g) In the final period of general expansion (between reference cycle stages IV and V), the proportion of commodities contributing to expansion in buyers' outlays is reduced for all groups except raw materials, the reduction being greatest for foods and consumer goods generally.

h) The abrupt reversal of the cyclical current after reference cycle stage V is accompanied by an extreme shrinkage in monetary payments for all classes of goods. With this shrinkage comes another revolutionary shift in the spectrum of buyers' outlays. Purchasing is curtailed throughout the economy, but in relative terms the focus shifts from the heavy industry, capital equipment, and durable goods sectors to the farm products, consumption goods, and nondurable sectors. In these latter groups resistance to the forces of recession is strongest. The relative advantage of consumption goods and nondurables is reduced during the next two periods (between reference cycle stages VI and VIII), as general contraction becomes more pervasive, and is then sharply increased in the terminal stages of contraction as the early pressures of recovery are felt in the markets for these goods. As they led in checking contraction, so do consumption goods, nondurables, and farm products lead in initiating recovery. Thereafter, as business at large passes the trough of depression at stage I of reference cycles, these are shouldered from the lead by durables, capital goods, nonfarm products, and producer goods.

30) These expansions and contractions in monetary payments reflect the combined influence of fluctuations in unit prices and in the quantity of goods changing hands. We summarize now

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the roles of each factor in the cyclical movements of outlays and revenues for major classes of goods.

a) In the earliest manifestations of recovery in the consumer goods, farm products, and nondurable sectors (between reference cycle stages VI-VII and VII-VIII) increases in quantities are solely responsible for increases in the proportion of commodities showing outlay advances.

b) In the general reenforcing of incipient expansion in the farm products, consumption goods sectors during the final phase of contraction in business at large, and in the initiation of outlay increases for durables and industrial products generally, the quantity factor still plays a dominating role in all commodity groups. Price increases begin to supplement quantity gains, however, particularly among farm products, foods, and nondurables.

c) As the turn is rounded at stage IX of reference cycles, price becomes the dominant factor making for heavier monetary outlays by buyers of farm products, consumption goods, nondurables, and raw materials. This is the case, indeed, for 11 of our 16 groups. Thus early in business cycles there is manifest pressure on the supplies of certain classes of goods—goods whose supply cannot be expanded on short notice. For metals and other minerals, durable goods, capital equipment, and non-farm products an increase in the quantity of goods changing hands is the chief factor making for heavier outlays.

d) In the pervasive check to expansion that comes after reference cycle stage II, quantities play a dominant role, forcing reductions in the scope of expansion for 10 of the 16 commodity groups. Prices exert a similar influence in 5 groups.

e) With the resumption of expansion in buyers' outlays after stage III, quantities play the chief part among animal products, consumption goods, and nondurables. Price advances are predominantly responsible for the increased scope of outlay increases among industrial products, durables, and capital equipment. Limits on volume expansion are being reached for industrial products and durables.

f) Restrictions on outlay increases in the final period of general business expansion (between stages IV and V) reflect price

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weakness among capital goods, nonfarm products, metals, and durable goods. The quantity factor is dominant in checking outlay increases among farm products, nondurables, and consumption goods generally.

g) As general business contraction develops after stage V prices reenforce quantities in a sharp curtailment of buyers' outlays, but quantity is the dominant factor for 13 of the 16 commodity groups. For foods alone is price clearly more potent than quantity in reducing the percentage of commodities for which outlays expand.

h) The leading depressant role passes to prices as the momentum of contraction gains between reference cycle stages VI and VII. The downward pressure from quantities is relaxed; for certain groups actual outlay increases result from advances in physical volume. With the passage to period VII-VIII, which we have already reviewed, amelioration continues; prices press downward, but less heavily, quantities press downward, but less generally than prices, and various shoots of recovery appear among physical volume records. As this movement spreads, and buyers' outlays expand in markets for a wide variety of commodities, the familiar pattern of recovery repeats itself in a new cycle.