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PRICES: PATTERNS AND EXPECTATIONS

An important economic challenge of 1966 will be the reconciliation of high-level employment—and low-level unemployment—with cost-price stability. That theme is strongly emphasized in this year's *Economic Report of the President* and in the Annual Report of the Council of Economic Advisers, as well as in most discussions of the economic outlook for 1966. Such emphasis is not surprising in view of the fact that, as the economy narrows its margin of unused physical and human resources—which it has been doing—bottlenecks in supply are encountered and upward pressures on costs and prices are more easily generated. And it is these latter types of conditions that seem to have come to the center stage of economic activity in recent months.
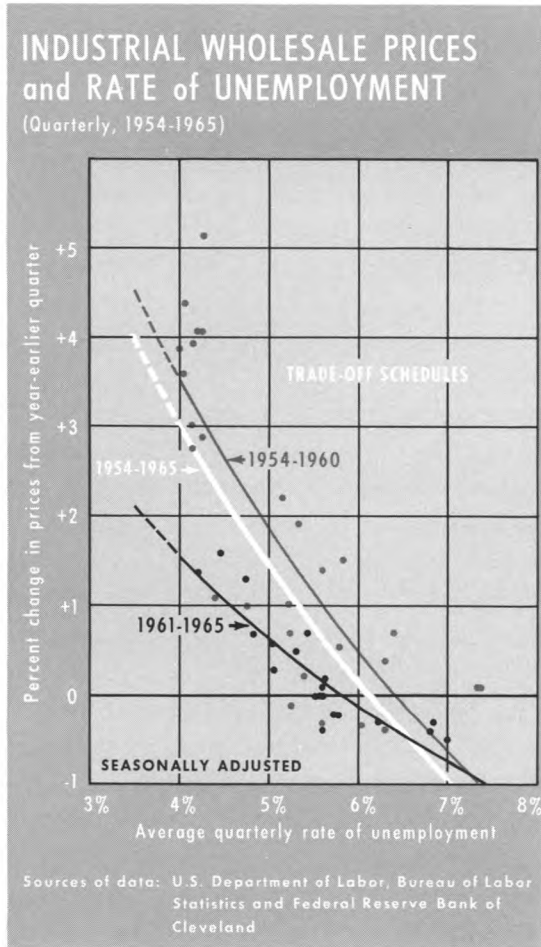
Price increases, *if widespread and persistent*, create an inflationary psychology that manifests itself in speculation and further price increases. Cumulative price increases in turn can cause serious imbalances in the domestic economy and could contribute to an erosion of world confidence in the dollar, not to mention a deterioration in the balance of payments itself. Those considerations are, of course, no less significant than the general goal of avoiding the personal inequities and dislocations stemming from inflation.

Given the recent upgrading of forecasts of the economic outlook for the months ahead, the economy appears to have entered a crucial testing phase, with the fundamental question whether high-level resource utilization can be maintained while simultaneously avoiding widespread increases in costs and prices. It is therefore a particularly appropriate time to examine emerging price patterns and price expectations.

THE TRADE-OFF PROBLEM

In general, the goals of fiscal and monetary policy—in fact, of all public policy—are full employment of resources, satisfactory economic growth, reasonable price stability, and balance of payments equilibrium. While achievement of these goals clearly requires the cooperation and support of private policies, as a practical matter, it is extremely difficult to arrive at the "correct" mix of public and private policies. Consequently, achieving a desired degree of success in one or more goals often entails some sacrifice, or a lesser degree of success, in one or more other goals, involving what is commonly called the "trade-off" of one objective for another. This is not to imply that achieving one economic objective makes it impossible to achieve one or more other objectives. Nor does it mean that the economy needs to forego achieving one objective so as to guarantee the success of another. The trade-off notion does mean,

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INDUSTRIAL WHOLESALE PRICES and RATE of UNEMPLOYMENT
(Quarterly, 1954-1965)

Percent change in prices from year-earlier quarter

+5
+4
TRADE-OFF SCHEDULES
+3
1954-1965 —— ←1954-1960
+2
+1
1961-1965 →
0
SEASONALLY ADJUSTED
-1

3%   4%   5%   6%   7%   8%
Average quarterly rate of unemployment

Sources of data: U.S. Department of Labor, Bureau of Labor Statistics and Federal Reserve Bank of Cleveland

NOTE: See footnote 1.

however, that the very nature of the institutions and processes of the U. S. economy is such that all economic objectives are seldom, if ever, fully and simultaneously attained. What actually seems to be sought perhaps may be best expressed as the "maximum harmonious satisfaction" of the various objectives.

Chart 1 presents one example of the trade-offs that often occur among economic objec-

tives—achieving progressively lower rates of unemployment at the possible expense of rising industrial prices. (Of all the major price indexes, industrial wholesale prices are usually regarded as the most responsive to changes in the level of economic activity, as reflected, for example, in the rate of unemployment.) For each quarter during the period 1954 to 1965, a point is plotted which reflects the average rate of unemployment on the horizontal axis, and the percent change in industrial wholesale prices from the year-earlier quarter on the vertical axis. The nature of the trade-off is readily apparent; the lower the rate of unemployment, the greater the risk of price increases. (Other time spans were tested, but the results were essentially the same.) Thus, in the fourth quarter of 1963, unemployment averaged 5.63 percent and prices were 0.2 percent higher than in the year-earlier quarter; in the fourth quarter of 1964, unemployment averaged 5.03 percent and prices were 0.6 percent higher than a year earlier; and in the fourth quarter of 1965, unemployment averaged 4.2 percent and prices were up 1.4 percent. Accordingly, as the rate of unemployment has moved down, the corresponding amount of price increase has tended to accelerate, at least in absolute terms. With the rate of unemployment expected to average 3.75 percent this year, according to the projections of the Council of Economic Advisers, what might the increase in industrial prices be?

The trade-off relationships between unemployment and prices are shown in Chart 1; such relationships provide a crude indication of possible changes in industrial prices, given various alternative rates of unemployment.

The three lines portrayed in the chart best fit the quarterly observations of unemployment rates and price changes during the post-Korean years, 1954 to 1965, taken as a whole and for the two subperiods taken separately. The steeper slope of the 1954-60 curve compared with the 1961-65 curve is attributable to the fact that relatively higher prices accompanied the 1955-57 investment boom, when the rate of year-to-year price increase was as high as 5.1 percent. Despite an average quarterly rate of unemployment no lower than 4 percent at that time, relatively large price increases occurred because of significant changes in the composition of demand, accompanied by shortages and bottlenecks in production.

If the line fitted to the data for 1954-65 is extrapolated, on the basis of a statistical formulation, to an unemployment rate of, say, 3.5 percent, as shown by the dashed portion of the curve, industrial prices in 1966 might be expected to increase somewhere in the range of 3 percent to 4 percent over a year earlier. But caution must be exercised in assuming that the 12-year pattern will prevail in 1966, particularly because new relationships seem to have developed during the current expansion, as suggested by the line fitted in a similar way to the data for the 1961-65 subperiod. Conceivably, there has been a downward structural shift in the trade-off schedule —perhaps because of increased labor mobility and job training programs, or changing patterns of domestic and international competition, or public policies in general.

If the curve based on the experience of the past five years is extrapolated to an unemployment rate of 3.75 percent, the associated increase in industrial prices in 1966 is about 1.8 percent over a year earlier. (In 1965, unemployment averaged 4.6 percent and industrial prices increased 1.3 percent.) If extrapolated to an unemployment rate of 3.5 percent, on the basis of the statistical formulation, industrial prices in 1966 show an increase of about 2.1 percent.[1] The foregoing is, of course, subject to a number of qualifications because prices are influenced by more than just the overall rate of unemployment and other things highly correlated with it. Accordingly, about all that can be said at this point is: on the basis of relationships between the rate of unemployment and price changes in recent years, if a similar relationship were to prevail in 1966, a reduction in the rate of unemployment to 3.75 percent could be achieved with something on the order of a 1.8-percent increase in industrial prices. Unfortunately, it is not known whether previously prevailing relationships will be perpetuated in 1966. And, in view of recent

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[1] The equations used in computing the curves are as follows:

1954-65, $\log Y = 0.05557 - 0.07047 \log X$
          (0.00394)   (0.00578)   (0.00797)

1954-60, $\log Y = 0.05925 - 0.07329 \log X$
          (0.00411)   (0.00714)   (0.01000)

1961-65, $\log Y = 0.03141 - 0.04099 \log X$
          (0.00125)   (0.00365)   (0.00492)

where Y is the ratio of quarterly industrial prices to quarterly industrial prices one year earlier, X is the quarterly rate of unemployment, and the figures in parentheses are standard errors of estimate. Assuming, then, that the 1961-65 schedule holds for a 3.75 percent rate of unemployment in 1966, chances are two out of three that prices will increase between 1.5 percent and 2.1 percent; and chances are 95 out of 100 that prices will increase between 1.2 percent and 2.4 percent.

evidence on actual price developments, it is increasingly unlikely that they will be. In fact, the danger seems to be more a possibility of serious pressures on plant capacity or selected labor shortages, which in turn could encourage industrial prices to spiral upward. Such a development would of course indicate that the 1961-65 unemployment-price relationship had been destroyed. Whether this is to be the case may be suggested in the review of recent and anticipated price changes presented in the pages that follow.

OVERALL PERSPECTIVE ON PRICES

Chart 2 provides general perspective on the major price indexes commonly used as approximations of the general price level. Although no single price index is satisfactory for all purposes, each index does have its own uses and advantages.
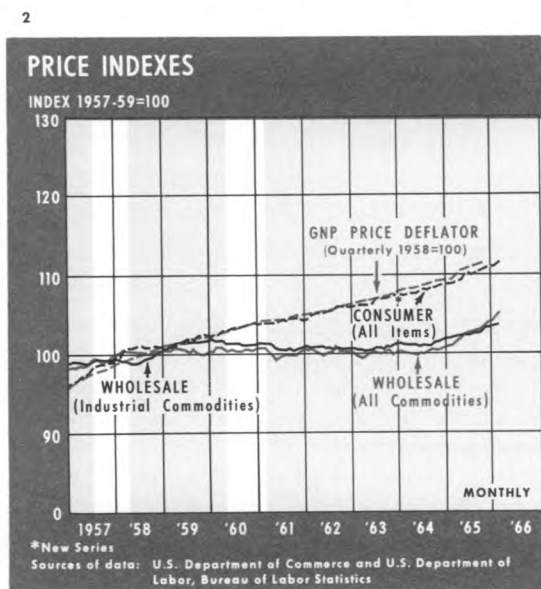
The *Gross National Product deflator* is the most comprehensive price indicator available. It is derived implicitly by dividing the sum of

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PRICE INDEXES

INDEX 1957-59=100

GNP PRICE DEFLATOR
(Quarterly 1958=100)

CONSUMER
(All Items)

WHOLESALE
(Industrial Commodities)

WHOLESALE
(All Commodities)

MONTHLY

1957 '58 '59 '60 '61 '62 '63 '64 '65 '66

*New Series
Sources of data: U.S. Department of Commerce and U.S. Department of Labor, Bureau of Labor Statistics

GNP components in current dollars by the sum of the corresponding components converted to 1958 dollars. (The latter is done by using the most appropriate price indexes available—largely the various groupings of consumer and wholesale prices.) The GNP deflator is useful in distinguishing GNP changes that are due to price movements from GNP changes that represent changes in physical output. *The Consumer Price Index* is the single best measure of prices at the retail level and it is frequently, although improperly, used as an index of the cost of living. *The Wholesale Price Index* is generally thought to be a better measure of price behavior than the CPI. Since one-fourth of the WPI consists of farm and food prices, which are largely independent of general business conditions, price analysts pay close attention to industrial wholesale prices as the best guide to price developments in the business sector.
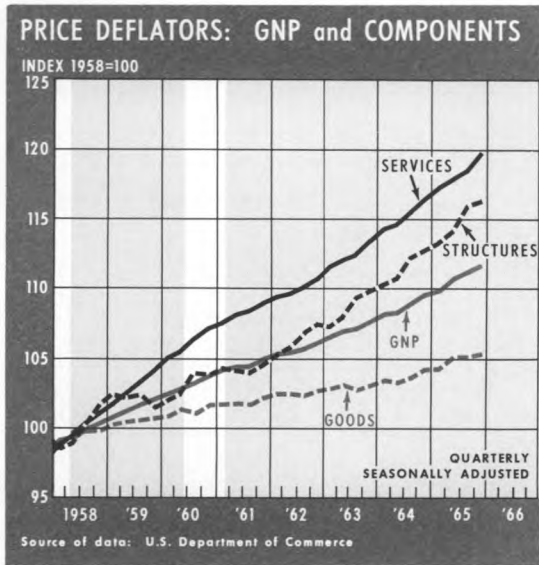
The most striking feature of Chart 2 perhaps is the sharp divergence between wholesale prices, on the one hand, and consumer prices and the GNP deflator, on the other. Historically, the latter two price indexes have moved closely together. The upward drift in both the GNP price deflator and the CPI from the late 1950's until late 1964 was of little significance to most close observers of price behavior, while the stability in wholesale prices during that time *was* considered to be significant. Since the latter half of 1964, however, *all* major price indexes have been increasing, and at the highest rates in recent years!

THE GNP PRICE DEFLATOR

Because the GNP price deflator has received much attention in recent months, it seems

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PRICE DEFLATORS: GNP and COMPONENTS

INDEX 1958=100

SERVICES

STRUCTURES

GNP

GOODS

QUARTERLY
SEASONALLY ADJUSTED

1958 '59 '60 '61 '62 '63 '64 '65 '66

Source of data: U.S. Department of Commerce

worthwhile to take a closer look at this measure and consider what it means. The 1.8-percent increase in the GNP deflator last year means that one-fourth of the 7.6-percent gain in the nation's total output (or $12 billion of $48 billion) represented price increases. However, the increase in the GNP deflator, which is supposed to be a weighted measure of all price changes, overstates the extent of price inflation, reflecting upward biases in major components of the deflator, specifically in services and in structures.

Chart 3 illustrates the recent dramatic price increases for public and private services, which account for almost 40 percent of GNP. In 1965 alone, prices of total services increased 2.7 percent. Two-thirds of the implicit price deflator for services is based on prices of consumer services, where there is generally thought to be an incomplete allowance for quality improvements and a corresponding overstatement of real price increases. The remainder of the price deflator for services is

based largely on wage and salary scales of Government employees. Therefore, every pay raise for a Government worker automatically becomes a "price increase," regardless of productivity gains—and those are difficult to measure in the Government sector. Thus, in the fourth quarter of 1965, the above-average gain in the price deflator for services partly reflected pay raises for both Government civilian employees and military personnel.

The price deflator for structures, accounting for about 11 percent of GNP, is based on wage rates and costs of building materials with few allowances for productivity gains. Last year's 3-percent increase in prices of structures was chiefly due to above-average wage increases in the construction industry, notably in the third quarter of 1965. It should be emphasized that a wage increase is not a true price increase, but the deflators do not make this distinction. According to the Council of Economic Advisers, the price deflator for structures in 1966 once again is expected to increase more than the overall GNP deflator.

The price deflator for total goods, representing about half of GNP, rose 1.2 percent in 1965, or twice the average annual rate of increase during the preceding six years. Consumer nondurables (largely food) and producers' durable equipment were responsible for the higher prices of goods. Prices of consumer durables actually declined 1.4 percent in 1965, in part because of excise tax reductions.

Viewing the GNP price deflator as a whole, many private business forecasters are anticipating an increase in 1966 ranging from 2 percent to 3 percent. With the nation's total
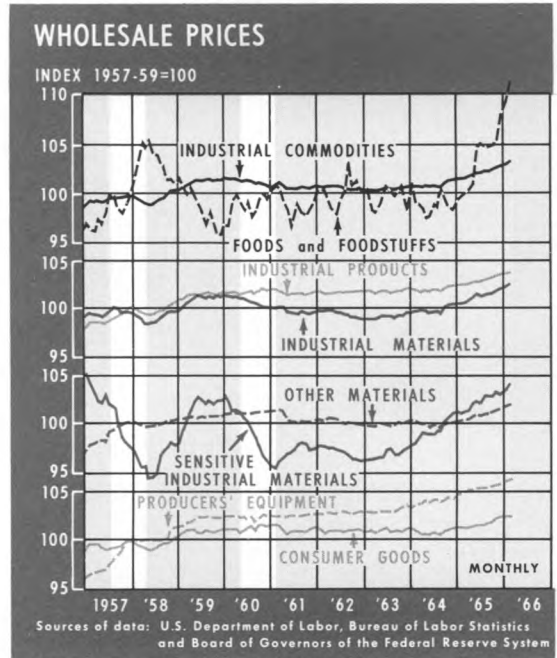
output expected to be considerably upwards of $700 billion in 1966, the *difference* between a 2-percent and a 3-percent increase in the overall price deflator would be more than $7 billion, a not insignificant amount. Moreover, as an illustration, a 3-percent increase in the GNP deflator would in effect "take away" $20 billion of, say, a 7.4 percent ($50 billion) increase in GNP. (Some might prefer to view the price effect as an "add on" rather than a "take away.")

WHOLESALE PRICES

The composite WPI includes prices of farm products, processed foods, and industrial commodities at the first significant commercial transaction (not necessarily at wholesale). By itself, the total WPI has limitations in analysis of price developments because it does not relate to any particular sector of the economy or to any special group of buyers or sellers. Specific needs of businessmen and business analysts are better served by price indexes for major industry groups, subgroups and individual product classes, or by price indexes that correspond to market sectors.

Chart 4 shows the Federal Reserve Board's groupings of wholesale prices, derived from indexes compiled by the Bureau of Labor Statistics and classified by stage of processing. The top panel in the chart separates prices of industrial commodities, which are relatively sluggish, from prices of foodstuffs, which are volatile because of frequent changes in supply. Until the end of 1964, there were a number of periods when prices of industrial commodities and foodstuffs moved in opposite directions, thus tending to smooth the total WPI. But, as the top panel shows, industrial prices began

WHOLESALE PRICES
INDEX 1957-59=100

Sources of data: U.S. Department of Labor, Bureau of Labor Statistics and Board of Governors of the Federal Reserve System

to increase in the fall of 1964, and prices of foodstuffs began to rise at a rapid rate in January 1965. The concurrence of price increases for industrials and foodstuffs pushed the total WPI to record highs during 1965 and in recent months. Higher prices of foodstuffs at wholesale were transmitted to the retail level, in turn causing above-average gains in the CPI during 1965 (see Chart 2).

In the second panel of Chart 4, industrial prices are grouped into indexes for industrial materials and finished industrial products. (Materials have a slightly larger weight than products.) Prices of products tend to be relatively stable when prices of materials are either declining or holding steady. The sustained price rise in materials, which began in the fall of 1964, coincided with a price rise of almost equal magnitude in products.

The third panel of Chart 4 shows prices of "sensitive" and "other" industrial materials. Because prices of sensitive industrial materials respond quickly to cyclical changes in supply and demand, this index usually strengthens during periods of expansion and weakens during periods of slack.[2] Widespread price increases in sensitive industrial materials usually reflect increased pressures on capacity to produce other materials and rising operating rates for manufacturing in general.

The current upswing in the sensitive industrial materials index, which stems primarily from a sizable price increase in nonferrous metals, has been reinforced during the past year by considerable price increases in hides, skins, and leather. Many nonferrous metals have experienced tight supply conditions because of periodic strikes and political uncertainties abroad. Prices of hides, skins, and leather have soared largely because of sharp reductions in foreign supplies. Prices of other industrial materials, accounting for 43 percent of the industrial WPI, began to rise in the fall of 1964, well after the sensitive index had turned up.
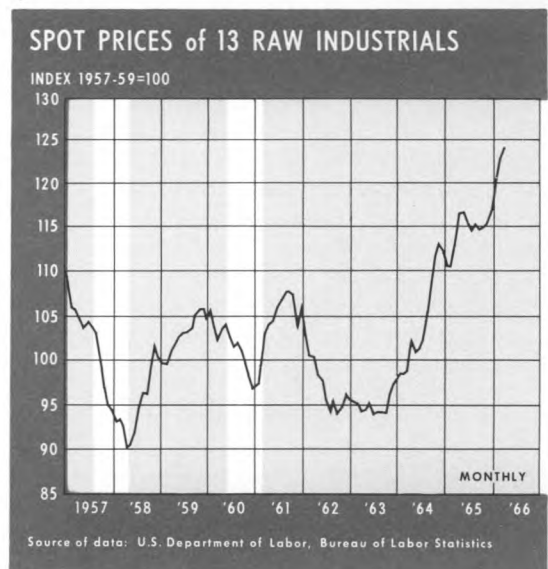
The bottom panel of Chart 4 separates industrial products into indexes for producers' equipment and consumer nonfoods, accounting for 15 percent and 28 percent, respectively, of the industrial WPI. Prices of producers' equipment began to strengthen in the fall of 1963, while prices of consumer nonfoods started to inch up one year later.

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[2] The sensitive industrial materials group, accounting for 13.5 percent of the industrial WPI, includes iron and steel scrap, nonferrous metals, lumber, plywood, wastepaper, rubber, hides, leather, textile fibers and intermediate products, and residual fuel oil.

SPOT PRICES

As the indexes in Chart 4 indicate, and as should be expected because of the nature of lead-lag relationships in economic phenomena, current and near-term price developments are influenced by previous price patterns. Rapid or sustained price increases in sensitive industrial materials tend to be followed by price increases in other industrial materials, and finally by price increases in finished goods. On that account, the daily spot price index for 13 raw industrials, shown in Chart 5, is a crude barometer of current and prospective price developments—at least as appraised by experienced traders on the commodity exchanges.

Although the 13 raw industrials account for only 1.2 percent of the industrial WPI, spot prices reflect the price climate for many other industrial materials. Consequently, an increase in the spot price index generally is considered to be one of the first signs of price strengthening in the industrial sector, although

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SPOT PRICES of 13 RAW INDUSTRIALS

INDEX 1957-59=100

MONTHLY

Source of data: U.S. Department of Labor, Bureau of Labor Statistics

it sometimes has given false signals.

When spot prices of raw industrials began to recover from a depressed state in October 1963, the Federal Reserve's broadly based price grouping for industrial materials experienced a moderate firming (0.8 percent) until the spring of 1964. (As previously noted, industrial materials prices began a sustained rise of greater magnitude in the fall of 1964—see Chart 4.) The broad upsweep in spot prices that began in late 1963 was interrupted for about six months in 1965; spot prices fluctuated within a narrow range of one percent from June 1965 to November 1965. In December 1965, however, spot prices began to move up once again at a rapid rate, largely because of the metals component.[3]
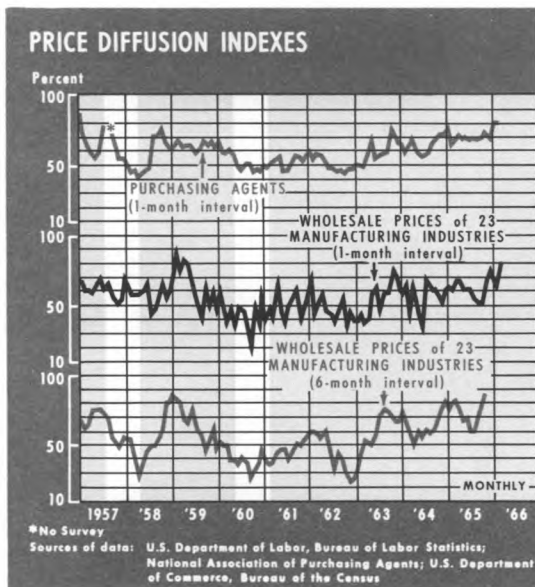
PRICE DIFFUSION INDEXES

Price diffusion indexes are supplementary devices for gauging the price climate.[4] Diffusion indexes help to anticipate the direction and pervasiveness of price changes by measuring the percentage of components in a price index that are rising over a certain time span.[5] When diffusion indexes are above 50

[3] Copper scrap, lead scrap, steel scrap, tin, and zinc.

[4] See the monthly publication, *Business Cycle Developments*, U. S. Department of Commerce, Bureau of the Census, for details concerning various diffusion indexes. See also "Perspective on Prices—A Further Note," *Economic Review* Federal Reserve Bank of Cleveland, Cleveland, Ohio, December 1964, for a discussion of the postwar record and the forecasting properties of price diffusion indexes for 23 manufacturing industries.

[5] In computing the percentage of components rising, the Bureau of the Census counts instances of no change as one-half. To maintain symmetry in the diffusion indexes shown in Chart 6, that convention was followed in computing the price diffusion index based on the monthly survey of the National Association of Purchasing Agents.

PRICE DIFFUSION INDEXES

Sources of data: U.S. Department of Labor, Bureau of Labor Statistics; National Association of Purchasing Agents; U.S. Department of Commerce, Bureau of the Census

percent, price increases are outnumbering price declines, and that usually foreshadows increases in the aggregate price index.
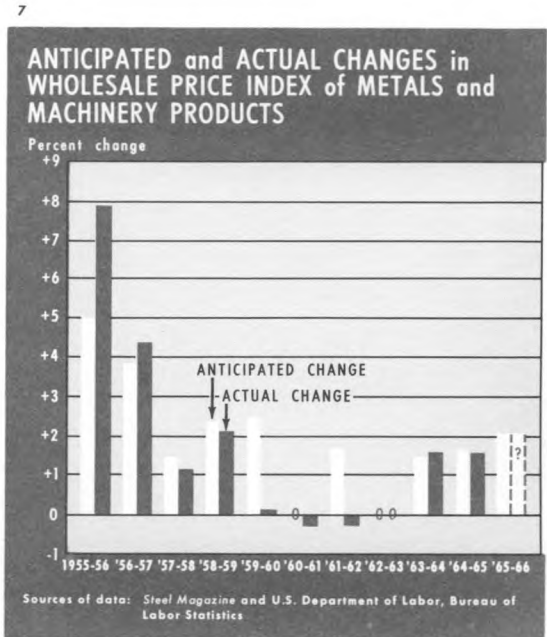
In the top panel of Chart 6, each observation shows the percentage of purchasing agents reporting higher prices from the previous month plus one-half the percentage of purchasing agents reporting unchanged prices. Note that each time the P.A.'s diffusion index has fallen below the 50-percent level—during early 1958, the latter half of 1960, mid-1961, and the latter half of 1962—the industrial WPI has declined or has exhibited weakness (see Chart 4). The sharp upswing in the P.A.'s diffusion index, from 55 percent in June 1964 to 76 percent in January 1965, first *anticipated* and subsequently *reflected* the rise in industrial prices that began in late 1964. That upward price pressures have persisted during 1965 and early 1966 is clearly revealed in the relatively high level of the P.A.'s diffusion index since late 1964.

The middle panel of Chart 6 shows the percentage of 23 manufacturing industries experiencing higher prices from the previous month, and the bottom panel shows the percentage expanding from six months earlier. Since mid-1964, the monthly diffusion index has been above the 50-percent level in each month, indicating that more month-to-month price changes in manufacturing have been on the plus side rather than the minus side. The six-month span diffusion index smooths erratic monthly fluctuations and thus more clearly reveals cyclical price patterns.[6] The index rose to the 50-percent level in early 1963, and has since then remained above that level, reflecting gradual but persistent price strengthening. (The spring of 1963 marked the end of price weakness in industrial commodities—see Chart 4.) The most recent upturn in the six-month span diffusion index suggests that upward price pressures from the manufacturing sector have gained renewed momentum.

PRICE EXPECTATIONS

At times, attitudes and expectations can significantly influence actual price developments. If consumers or businessmen become imbued with an inflationary psychology—that is, they expect currently rising prices to persist or perhaps to accelerate—actions may be taken that tend to accentuate inflationary pressures. For example, demands for larger wage increases may be stepped up, or consumers may have less desire to save and a greater willingness to spend. Businessmen

ANTICIPATED and ACTUAL CHANGES in WHOLESALE PRICE INDEX of METALS and MACHINERY PRODUCTS

Sources of data: *Steel Magazine* and U.S. Department of Labor, Bureau of Labor Statistics

may wish to build inventories faster, or to invest extra amounts in new plant and equipment before higher prices raise total costs. If costs and prices are rising, and are expected to continue to do so, it becomes easier for businessmen to mark up prices (and the odds are probably better that the higher prices will stick).

Some perspective on price expectations, at least from the standpoint of the business sector, is provided in the last two charts. In view of the strategic role that metals and machinery prices play in the industrial WPI, the record of metalworking managers' price expectations, as reported in *Steel* magazine and as shown in Chart 7, may be enlightening.[7] Last fall, more than 7,000 metalworking plant

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[6] Each monthly plot is centered in the middle of the six-month periods over which changes are measured.

[7] Actual price changes for the metalworking industries were computed from weighted averages of BLS price indexes for metals and metal products, and machinery and motive products (there is no price index for instruments).

8

INDUSTRIAL PRICES: EXPECTATIONS and CHANGES

Net percent of businessmen expecting price increases from year-earlier quarter

Actual percent change from year-earlier quarter

Sources of data: U.S. Department of Labor, Bureau of Labor Statistics; data on expectations used by special permission from *Dun's Review & Modern Industry*, copyright 1966, Dun & Bradstreet Publications Corporation

managers expected average selling prices in their industries to increase 2.1 percent in 1966. That was the largest annual price increase anticipated since the 1959 survey. The survey results have been highly accurate for the past three years, and have been wide of actual price changes only three times during the past ten years—during the investment boom of 1956, during the recession year of 1960, and during the slack year of 1962.

In the fall of 1964, the survey showed an expected price increase of 1.7 percent in the metalworking industries during 1965. The actual price increase of 1.6 percent accounted for more than half of last year's rise in the industrial WPI. According to the survey in the fall of 1965, this year's expected price increases over 1965, by industry, are as follows: nonelectrical machinery, up 2.6 percent; primary metals, up 2.3 percent; fabricated metals, up 2.2 percent; transportation equipment, up 1.8 percent; electrical machin-

ery, up 1.2 percent; and instruments, up 1.1 percent. What will actually materialize in 1966 is of course a major point of question at this juncture.

Chart 8 illustrates the ebb and flow of businessmen's price expectations, as measured by Dun and Bradstreet's quarterly survey of approximately 1,600 businessmen. The *net* percentage of businessmen expecting price increases from the year-earlier quarter is plotted on the left scale, that is, the percentage expecting price increases *minus* the percentage expecting price decreases. Each quarterly observation refers to the survey taken during the preceding quarter. The actual percentage change in industrial wholesale prices from the year-earlier quarter is plotted on the right scale.

Several interesting observations emerge from Chart 8. For some time, businessmen apparently have been anticipating higher prices. Thus, as shown in the chart, there was not a single quarter during the past seven years when net expectations were at or below zero. (In fact, there have been no quarterly surveys since 1954 when net expectations were *at* or *below* zero.) Another point is that businessmen's price expectations have often lagged behind actual price changes. For example, beginning in the third quarter of 1959, the rate of price increase became progressively lower until prices actually declined. But it took businessmen a full year to accept those realities and to adjust their price expectations accordingly. However, businessmen have been more often right than wrong in anticipating price developments. Thus, from late 1962 until early 1964, expectations preceded the direction of actual price changes.

Again, from late 1964 to mid-1965, a rise in expectations foreshadowed an acceleration in the rate of price increase. For the first quarter of 1966, businessmen correctly anticipated the rise in industrial prices from a year earlier. The most recent survey for the second quarter of 1966 reveals a continued sharp rise in expectations of higher prices—in fact, one of the highest percentages of net expectations since 1951.

SUMMARY AND CONCLUSIONS

The widespread attention paid to price developments in recent months stems, generally, from concern in many quarters that the economic expansion may be getting out of hand, and, specifically, from a convergence of rising prices for both agricultural and industrial commodities, and from above-average increases in the costs of construction and services. Against the background of the recent sharp increases in GNP and industrial production, it is indeed not surprising that, in view of the widely held expectation of a rapid pace of economic activity in the months ahead, general interest in the behavior of prices has been heightened. Experience has shown that the risk of inflation becomes more serious as the economy moves toward higher rates of resource utilization. During the past year, the rate of unemployment has declined significantly, and many manufacturers have pushed their operating rates close to the limits of physical capacity. At the same time, upward price pressures have been accumulating, as evidenced by the behavior of the major price indexes and by various anticipatory data such as spot prices, diffusion indexes, and surveys of price expectations. The extent to which further price increases materialize of course depends on the actual unfolding of economic events and the shaping of both public and private policies, and the subsequent interaction of events and policy. Concern in this area is reflected in the fact that the Administration has exhorted labor and management to exercise restraint in wage demands and in price policies. The less the measure of success achieved in holding down cost and prices, the greater will be the burden on fiscal and monetary policies. Whatever the outcome, it is perhaps worthy of note that, after learning in the past five years how to reinvigorate a lagging economy, serious thought is being given to how to hold that vigor in check.

WHAT HAPPENS WHEN BANKS RAISE (OR DO NOT RAISE) INTEREST RATES ON SAVINGS DEPOSITS?

There is widespread interest in what banks do and what happens to banks—in terms of profitability, portfolio adjustments, and deposit mix—when changes are made in interest rates paid on savings deposits. While there is no simple and all-inclusive way of fully coming to grips with each and every aspect of the question, some insights can be gained by comparing the behavior patterns of banks that raise rates with those that do not—using as a basis of analysis, a particular group of banks and a specified period of time.

The purpose of this article is to report on just such an analysis. The banks included in the discussion are those that participated in a survey of interest rates offered by Fourth District member banks on their savings and time deposits, which was reported on in an earlier article in the *Economic Review*.[1] Specifically, focus is on a comparison of the characteristics of banks that, during the first half of 1962, raised rates on savings deposits (passbook savings) with the characteristics of banks that did not change rates ("change" banks are compared with "no change"banks). The overall time period used is that from mid-1961 through the end of 1963, which makes

[1] "Survey of Changes in Interest Rates on Savings and Time Deposits," *Economic Review*, Federal Reserve Bank of Cleveland, Cleveland, Ohio, December 1965.

it possible to look at both types of banks before and after the selected time period of possible rate change. Following the section on data and methodology, the subsequent sections discuss what happened when banks did or did not raise interest rates on savings deposits.

DATA AND METHODOLOGY

Basic data on assets, liabilities, revenues, and expenses are from Call Reports and Income and Dividend Statements submitted by member banks. From these data were derived a number of measures or characteristics of banks and bank behavior, which are presented in the table accompanying this article. Such aspects as bank size, the relative importance of savings deposits, the ratio of loans to deposits, percentage changes in various assets and liabilities, and selected measures of costs, revenues, and profits provide a fairly comprehensive picture of the "nature" and "performance" of banks.

As indicated earlier, banks included in the analysis are the Fourth District member banks that responded to the survey of interest rates conducted by the Research Department of this bank in early 1965. Banks involved in mergers from midyear 1961 through December 1963 have been excluded, as have banks

MEASURES OF BANKING ACTIVITY AND PERFORMANCE
Averages of Selected Fourth District Member Banks
1961-1963

	1961		1962		1963	
	Change Banks	No Change Banks	Change Banks	No Change Banks	Change Banks	No Change Banks
Number of Banks (end of year)	94	253	94	253	93	240
Selected Characteristics (end of year)						
1. Deposits, millions of dollars	$74.4a	$16.3	$81.2a	$17.4	$82.1a	$17.4
2. Savings deposits as a % of total deposits	45.5%a	39.0%	46.5%	37.4%	46.2%a	37.1%
3. Loans as a % of total deposits	51.8a	48.6	52.1a	49.1	54.2	52.4
Growth (period-to-period changes)	6/61—12/61		12/61—12/62		12/62—12/63	
4. Loans	2.8%	1.7%	9.8%	8.6%	11.3%	10.6%
5. Municipals	4.5	2.4	22.6a	13.8	31.8a	15.1
6. Total deposits	6.8	6.7	8.9a	7.4	7.1a	3.9
7. Demand deposits	10.1	10.8	2.9	6.4a	3.9a	1.1
8. Savings and time deposits	3.1	2.9	13.0a	8.9	10.5a	7.1
9. Savings deposits	3.4	3.3	12.4a	4.1	6.4a	1.6
10. Time deposits	—17.2	6.7a	128.2a	78.4	62.4a	44.3
Selected Revenues	1961		1962		1963	
11. Interest income on U. S. Govt. Sec. as a % of U. S. Govt. Sec.	2.97%	2.91%	3.00%	2.98%	3.33%	3.36%
12. Interest income on other securities as a % of other securities	3.11	2.99	3.13	3.33	2.89	3.35
13. Interest and charges on loans as a % of loans	4.68	5.79	5.69	5.76	5.69	5.70
14. Operating revenue as a % of total assets	4.10	3.97	4.13	4.02	4.28	4.23
Selected Costs						
15. Interest expense as a % of savings and time deposits	2.46%a	2.32%	2.84%a	2.38%	3.08%a	2.50%
16. Interest expense as a % of total operating expenses	38.70a	34.74	44.35a	35.66	47.01a	36.72
17. Total operating expenses as a % of total assets	2.99	2.93	3.15a	2.95	3.30a	3.12
Profitability						
18. Net operating revenue as a % of total assets	1.11%	1.04%	0.98%	1.08%a	0.98%	1.11%a
19. Net income (before taxes) as a % of total capital	11.64a	10.45	10.06	11.05a	9.89	10.69
20. Net income (after taxes) as a % of total capital	7.64a	6.81	6.82	7.70a	7.00	7.42

a Mean value significantly larger, at the 5-percent level, than that of the alternate group of banks.

Source: Federal Reserve Bank of Cleveland

that changed rates on savings deposits during the last half of 1962 and/or the year 1963. The first adjustment prevents distortions in percentage changes in various asset and liability items, which would likely have resulted from mergers; the two adjustments, taken together, make the sample reasonably consistent over the selected time period. In other words, the group of banks that increased rates on savings deposits during the first half of 1962 is compared with the group of banks that did not change rates, in terms of characteristics before and after the first half of 1962.

The overall time period was separated into three subperiods: (1) the last six months of 1961, (2) 1962 (the end of December 1961 through December 1962), and (3) 1963 (the end of December 1962 through December 1963). Data for the first period (which was limited to only six months because data were not accessible for the full year) reflect the position (characteristics) of banks prior to the January 1962 increase in maximum interest rates payable on savings deposits under Regulation Q. During the first six months of 1962, a large group of Fourth District member banks increased rates on savings deposits. (A second major increase in rates did not occur until mid-1964.) Data for 1962 and 1963 reflect the characteristics of banks following increases in interest rates on savings deposits, and are thus important in assessing both the impact of rate changes and the adjustments to such changes by member banks.

Each bank included in the study is classified as either a "change" bank or a "no change" bank, depending upon whether or not it reported an increase in the rate offered on savings deposits during the first six months

of 1962. The data presented in the table accompanying the article were derived by first calculating figures for each bank and then averaging these figures with those of all other banks included in the same group. Since averages of ratios and percentage changes of individual banks are compared, and not measures computed by aggregating data of all banks in each group, banks of different sizes are weighted equally in the computations of group averages. The comparisons of averages for the two groups of banks serve as the basis of the analysis. Emphasis is placed upon the position of one group of banks compared with the other group within each subperiod; however, some year-to-year comparisons are also included.

Because differences between the averages (means) for the two groups of banks could be the result of sampling variations, a statistical test was made of the "significance" of such differences. The test is discussed in the Appendix. Basically, the test allows a statement to be made, on the basis of probability considerations, as to whether or not the observed differences between group averages (means) are greater than would be expected on the basis of chance alone, in other words, whether differences are statistically significant or not.

SECOND HALF 1961—PRIOR TO THE CHANGE IN RATES

The general characteristics of the "change" banks during the last six months of 1961 differed substantially from those of the "no change" banks (see columns 1 and 2 of table). On balance, "change" banks were larger (line 1), and reported higher percentages of savings to total deposits and loans to deposits

(lines 2 and 3). Although reporting higher interest expenses on savings and time deposits (lines 15 and 16), "change" banks were more profitable than "no change" banks (lines 18 through 20).[2]

Growth. The growth of most assets and liabilities (lines 4 through 10) was greater for the "change" group of banks than for the "no change" group during the second half of 1961. Thus, "change" banks increased their loan and municipal portfolios relatively more than did "no change" banks (lines 4 and 5). In addition, although rates of growth of total deposits were similar for the two groups of banks (line 6), there were differences in the components of total deposits. Thus, while "no change" banks increased their holdings of time deposits much faster than did "change" banks (they actually declined—line 10), total time and savings deposits grew faster at "change" banks (line 8), indicating the importance of passbook savings to total savings and time deposits. Growth of savings deposits at "change" banks was in fact sufficient to offset a loss of nearly one-fifth in holdings of time deposits.[3]

Revenues. The revenue measures for 1961 presented in the table (lines 11 through 14) were similar for "change" and "no change"

banks. Further, average rates of return on loans as well as the operating revenue-to-asset relationships suggest that both groups of banks operated, on average, in similar types of banking markets.[4] Moreover, differences in these rates of return are not significantly different for the two groups of banks in the last half of 1961. (This is also the case for the other subperiods under review, as seen in the accompanying table.)

Costs. Cost measures for the two groups of banks presented in the accompanying table include interest expenses on savings and time deposits as a percent of total savings and time deposits and operating expenses, as well as operating expenses as a percent of assets (lines 15 through 17). The differences in these measures between "change" and "no change" banks are significantly different.[5]

For example, the relationships of interest expenses to total savings and time deposits and to total operating expenses were higher (6 percent and 11 percent, respectively) for "change" banks than for "no change" banks. The fact that these differences are significant indicates that "real" phenomena, for example, higher rates paid on relatively more savings deposits, influenced interest expenses of the two groups of banks. In contrast, the relationship of total operating expenses to assets was

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[2] All of these differences are statistically significant, that is, they are not likely to be due to chance.

[3] Statistically, however, only the difference in the growth of time deposits at the two groups of banks is significant. This suggests that the experience of the two groups of banks during the last half of 1961, with respect to growth of various assets and liabilities, was more similar—statistically—than the figures in the table indicate. As is seen later, this is in contrast to developments in 1962 and 1963, when "change" banks grew much faster than did "no change" banks.

[4] Averages of rates of return can easily conceal wide differences among individual banks, which might be revealed, for example, if rates of return on various types of loans were viewed individually. Even if such differences were found, however, allowance would have to be made for the influence of regional factors.

[5] Interest expenses on savings and time deposits are reported as a single figure by member banks; therefore, measures of interest expenses presented in the text are influenced by rates paid on both types of deposits.

only slightly larger for the "change" group, suggesting that these banks were able to off-set higher interest expenses by operating more efficiently — or less costly — in other areas.

Profits. Although "change" banks operated with higher interest expense than did "no change" banks (lines 15 and 16), they reported higher profits. This is shown in lines 18-20 by the relationships of net operating revenue to assets and net returns on capital (on both a before- and after-tax basis). The differences in net rates of return on capital between the two groups of banks were found to be significant. However, while "change" banks were more profitable than "no change" banks as measured by net returns to capital, which is the measure perhaps most important to stockholders, the fact that the relationship of net operating revenues to assets was not significantly different for the two groups suggests that the economic efficiency of the "change" banks was not necessarily greater than that of the "no change" banks. ("Change" banks may have been more efficient with respect to costs, however.)

Summary. The characteristics of "change" banks at the end of 1961 indicate that they were larger than "no change" banks. Since, for the most part, the "change" banks were located in urban areas, they would be expected to have a more specialized staff, and to be faced with more intensive interbank and nonbank competition than were "no change" banks. The fact that savings deposits represented a larger proportion of total deposits at "change" banks suggests that the increase in rates offered on savings deposits by such banks was based, at least in part, upon the desire to maintain or increase relative positions in individual market areas.

1962—RATE CHANGES AND ADJUSTMENTS

Banks that increased rates on savings deposits during the first six months of 1962 experienced mixed operating results for the year as a whole, as compared with banks that did not increase rates on savings deposits. Thus, "change" banks grew more rapidly, maintained higher loan-to-deposit ratios, and made larger additions to holdings of municipal securities than did "no change" banks (see columns 3 and 4 of table). However, an increase in interest expenses due in large part to higher offered rates on savings deposits at "change" banks, resulted in significantly higher ratios of operating expenses to assets and thereby reduced profitability. In fact, whereas "change" banks had appeared more profitable than "no change" banks in 1961, the reverse was true in 1962.

Growth. Total deposits at "change" banks increased, on average, by 8.9 percent in 1962, compared with 7.4 percent at "no change" banks (line 6). Growth of both savings and time deposits was substantially larger at "change" banks. This contrasts to performance in the second half of 1961, particularly in the case of time deposits, which had declined at "change" banks (lines 8-10). On the other hand, demand deposits in 1962 grew more rapidly at banks that did not increase rates on savings deposits (line 7). All of these changes are significant, indicating a real difference between the deposit growth of "change" and "no change" banks during 1962, which can be attributed in large part

to the increase in rates on savings deposits at "change" banks.[6]

Inflows of funds at both groups of banks were accompanied by aggressive asset acquisitions and adjustments. However, rates of increase of loans and municipal holdings at "change" banks were larger than at "no change" banks by 13 percent and over 60 percent, respectively (lines 4 and 5), and significantly so in the case of municipals.

Costs. Higher offered rates on savings deposits in 1962 at "change" banks resulted in higher figures for the relationships of (1) interest expenses to savings and time deposits, (2) interest expenses to operating expenses, and (3) operating expenses to assets, as compared with those for 1961 (lines 15-17).[7] Moreover, differences in these relationships between the two groups of banks in 1962 were greater than they had been in 1961, and were found to be statistically significant.

Attempts to adjust to higher interest expenses can be inferred from data presented in the table. For one thing, greater emphasis was placed by "change" banks on increasing holdings of municipals. For another, cost measures indicate that, given the increase in the proportions of interest expenses to savings and time deposits and total operating expenses, operating expenses as a proportion of assets should have risen by much more than they actually did.[8] These considerations suggest that "change" banks reacted to higher interest expenses by reducing other operating expenses (or by allowing them to grow less rapidly), as had been the case in 1961.

Profits. In contrast to 1961, when "change" banks reported higher profits, "no change" banks were more profitable in 1962 (lines 18 through 20). The differences in the relationship of net operating revenue to assets and of net income (before and after taxes) to capital were significantly in favor of "no change" banks. Thus, despite efforts made by "change" banks to offset higher interest expenses during the year, the profit figures for the previous year were not maintained. As seen in the next section, further adjustments to the increase in interest expenses were made during 1963.

Summary. The discussion of the performance of the two groups of banks indicates that, as a general matter, "change" banks increased their standing relative to "no change" banks with respect to growth of various assets and liabilities during 1962. During the year, however, "change" banks experienced an increase in interest expenses, following the increase in rates offered on

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[6] Although not considered separately in this study, rates paid on time deposits influenced rates of growth of such deposits as well as interest expenses. Most banks that increased rates on savings deposits during the first six months of 1962 also raised rates on time deposits, while many banks that did not raise rates on savings deposits *did* raise rates on time deposits. Differences between the two groups of banks discussed in the text should be interpreted accordingly.

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[7] See footnote 5.

[8] The rise in the relationship of operating expenses to assets was in fact the result of diverse behavior in the components of total operating expenses: Interest expenses as a percent of assets rose about 23 percent from 1961 to 1962, while all other operating expenses as a percent of assets declined by 6 percent. This suggests that given the 9-percent increase in total deposits, which can be taken as a proxy for the rate of gain of total assets at "change" banks, the dollar amounts of operating costs other than interest expenses rose only slightly during 1962.

savings deposits, and a concomitant reduction in profits only partly offset by greater efficiency in other operations. Since a year is insufficient for portfolio adjustments and changes in operations to be effected to the extent of offsetting the impact of higher interest expenses, further adjustments seemed necessary at the end of 1962.

1963—FURTHER ADJUSTMENTS

Data for 1963 suggest that substanital adjustments were made by "change" banks in order to move back to the position that existed prior to the increase in rates on savings deposits. "Change" banks continued to grow more rapidly, maintain a higher loan-to-deposit ratio, and increase municipal holdings faster than "no change" banks. Also, although profits of "change" banks were lower than for "no change" banks, as in 1962, "change" banks were able to increase net income (after taxes) as a percent of capital over the 1962 level, and to achieve some gains in narrowing profit differentials between the two groups of banks.

Growth. Rates of growth of all asset and liability items were more favorable for "change" banks than for "no change" banks in 1963 (columns 5 and 6, lines 4-10). "Change" banks acquired loans and municipal securities at more rapid rates than "no change" banks, with the difference between rates of growth of municipal holdings again significant. Holdings of municipal securities at "change" banks increased nearly one-third in 1963 as compared with 23 percent in 1962.

On the liability side, all deposit components grew significantly faster at "change" banks than at "no change" banks. It is of course not surprising that savings deposits increased more rapidly at "change" banks during both 1962 and 1963 than at "no change" banks, given the higher rates offered by the former group. In contrast to 1962, however, demand deposits in 1963 also increased more rapidly at "change" banks than at "no change" banks. This is somewhat contrary to the contention by some analysts that demand deposits and savings deposits are necessarily alternatives, that is, higher rates of growth of savings deposits always occur at the expense of demand deposits.

While the loan-to-deposit ratio for "change" banks was significantly greater than for "no change" banks at the end of 1961 and 1962, it was not the case at the end of 1963. This implies that the rate of growth of loans relative to the rate of growth of deposits was somewhat lower for "change" banks than for "no change" banks. Accordingly, although the loan-to-deposit ratio for "change" banks remained at a higher level than at "no change" banks in 1963, the relationship did not retain the same significance as in the two previous years.

Costs. Operating expenses as a percent of assets increased at both "change" banks and "no change" banks during 1963; "change" banks, however, had relatively larger increases in the relationships of interest expenses to savings and time deposits and to operating expenses (lines 15 through 17). All of the differences in the expense relationships were significant, as was the case for 1962.

"Change" banks in 1963, as in earlier periods, appear to have partially offset higher interest expenses by reducing (or reversing) the rate of growth of other operating expenses

relative to assets. The behavior of the relation-ships of various expenses to assets for the two groups of banks between 1962 and 1963 is set forth below:

	Percentage Change 1962-63
"Change" Banks	
Interest expense	+11.3%
Other operating expenses	— 0.2
Total operating expenses	+ 4.9
"No Change" Banks	
Interest expense	+ 9.0
Other operating expenses	+ 4.2
Total operating expenses	+ 5.9

Profits. The relationships of net operating revenue to assets and of net income (before and after taxes) to capital were higher for "no change" banks than for "change" banks at the end of 1963, as was the case a year earlier. However, the differences between the two groups of banks were neither as large in 1963 as in 1962, nor as significant (except for the difference between the net operating revenue-to-asset relationship). This suggests that "change" banks were partially success-ful in moving back to the position that existed prior to the change in rates on savings de-posits. The improvement resulted mainly from the smaller increase of expenses relative to asset growth at "change" banks than at "no change" banks.

Finally, "change" banks on average in 1963 increased returns (after taxes) to capital as compared with 1962. Tax-free income on municipal holdings probably accounted in large part for that improvement, judging from the large increase in holdings at "change" banks during 1963. "No change" banks, in contrast, showed less favorable returns in

1963 (on both a before- and after-tax basis), as compared with 1962.

Summary. Generally, data for 1963 indi-cate that "change" banks experienced sig-nificantly larger rates of growth of assets and liabilities than did "no change" banks. In addition, interest expenses as a proportion of assets grew more rapidly at "change" banks, while the relationship of other operat-ing expenses to assets declined slightly. (It increased by slightly over 4 percent at "no change" banks.) Evidently, "change" banks, in the face of higher interest expenses, were able to control the growth of other operating expenses relative to asset growth.

Finally, net returns to capital at "change" banks improved in 1963, although remaining below returns at "no change" banks. While rates of return to capital (lines 19 and 20) were higher for "no change" banks in 1963, they were not significantly higher, as was the case in 1962. In addition, the relationship of net income after taxes to capital increased in 1963 over 1962 at "change" banks, while "no change" banks experienced a decline. Thus, an improvement in the operations of "change" banks relative to "no change" banks is evident for 1963; the profitability of "change" banks, however, had not yet fully returned to the level that existed prior to in-creases in rates on savings deposits (line 20).

CONCLUDING COMMENTS

The findings presented in this article reveal that there were significant differences be-tween the two groups of banks discussed. No attempt has been made to explain fully bank actions with respect to rates offered on savings deposits. That is to say, the discussion has not

concerned itself with "external" factors that have an important bearing on bank behavior, for example, actions of nonmember banks, the influence of nonbank financial intermediaries, and the economic activity of the areas in which banks are located, among others. Such factors are not altogether excluded, however, since, for example, changes in loan-to-deposit ratios reflect both managerial performance and decision-making as well as external demand factors.

The characteristics of the banks discussed in this article should be evaluated as a group, or on an average basis, and not as indicative of the behavior patterns of an individual bank. The relationships developed and discussed here may or may not be representative of banks in individual areas or in areas other than the Fourth District during the period covered. Further, the relationships may or may not be useful in predicting the actions of Fourth District member banks during other periods of time and under different economic and financial conditions.

APPENDIX*

Differences between the various ratios and percentage changes of the "change" banks, as compared with those of the "no change" banks, were evaluated on the basis of the following statistical test:

$$t = \frac{\bar{x}_c - \bar{x}_{nc}}{\sigma \bar{x}_c - \bar{x}_{nc}},$$

where, $\bar{x}_c$ = individual ratio or percentage change for "change" banks,

$\bar{x}_{nc}$ = corresponding measure for "no change" banks, and

$\sigma \bar{x}_c - \bar{x}_{nc}$ = standard error of the difference between the two measures.

The "null" hypothesis was tested for each pair of means, that is, the statistic (t) resulting from the application of the formula was compared with a theoretical probability distribution to find out whether or not the observed statistic was significantly greater than zero. At the chosen 5-percent level of significance, any difference between means exceeding 1.96 standard errors of the differences between the means is considered as statistically significant. For differences found to be statistically significant, the inference is that the means are from two distinct populations; if not, the differences are likely to be mainly the result of sampling variation.

The computation of the standard errors of the differences between means took the following form:

$$\sigma \bar{x}_c - \bar{x}_{nc} = S \sqrt{\frac{N_1 + N_2}{N_1 N_2}}, \text{ where}$$

$$S = \sqrt{\frac{N_1 S_1^2 + N_2 S_2^2}{N_1 + N_2 - 2}},$$

and, S = square root of pooled variance,

S_1^2 = variance of selected measures for "change" group of banks,

N_1 = number of "change" banks,

S_1^2 = variance of corresponding measure for "no change" banks, and

N_2 = number of "no change" banks.

The foregoing is based on the assumption that the variance of each measure is equal for the two groups of banks. This assumption was employed because variances, although large, were similar for both groups of banks.

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* See W. J. Dixon and F. J. Massey, Jr., *Introduction to Statistical Analysis* (New York: McGraw-Hill Book Company, Inc., 1957), Chapter 9.

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