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Monthly Review

As the Nation Goes, So Goes the South?

The Southerner who forecasts that his state's income will change in response to income changes throughout the country may be right. His chances of error may be large, however, if he estimates the change will be exactly like a national one. In support of his projection, our Southern forecaster could rightly argue that the virtually uninterrupted income growth in the Southeastern states since 1950 has been closely linked to the overall economic expansion. Warning him of the pitfalls of generalizations, we would point out the degree to which income changes in specific areas of the South responded to national changes and how these changes varied widely among states. Moreover, in any specific year, state income changes might be much less closely tied to national changes than over a period of several years.

Measuring the relationship between year-to-year national and regional income changes provides some insight into the relative influences of local and national factors causing a change in a state's income. Also, the expected effects on per capita income in this part of the Southeast associated with a change in overall per capita income sheds some light on the seeming paradox of this area's faster-than-national rate of income growth and the widening dollar gap between U.S. and Southeastern per capita incomes.

Growing Faster, but Still Lagging

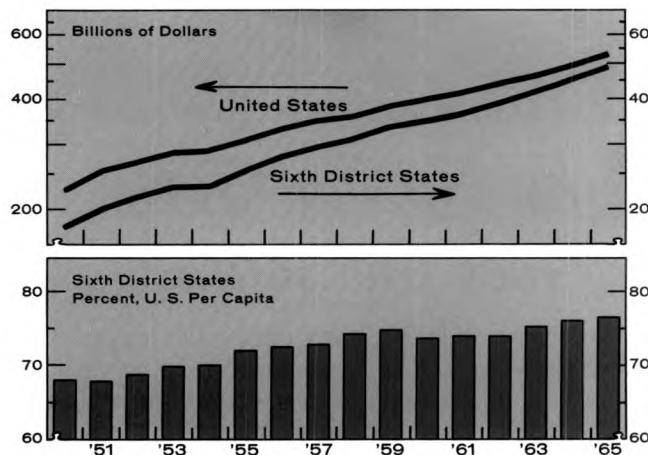
Probably the most meaningful measure of income change in terms of the economic well-being of the people in Alabama, Florida, Georgia, Louisiana, Mississippi, and Tennessee—the states wholly or partly in the Sixth Federal Reserve District—is the growth in per capita income. In 1965, per capita income in the District was 77 percent as high as in the nation, compared with 68 percent in 1950.

With the area's population increasing at about the same rate as that of the U.S., the gain on the nation in the level of per capita income was the result of the faster growth rate of the District states' total personal income. The annual average rate of increase in the District states' personal income between 1950 and 1965 was 10.8 percent, compared with 8.3 percent nationally. This relationship has continued in 1966, with District personal income in the first half of 1966 up 10.4 percent from a year ago compared with 9.0 percent for the entire nation.

The degree of association between District and national income changes is found in the answers to two questions: "At what rate does per capita income in this area change when per capita income for the entire U.S. changes one percent?" For convenience, we shall call this the "income flexibility" effect. It combines the influences of income change, population change, and the absolute level of per capita income in the District and its states. The second measure considers the question: "What is the expected actual change, expressed in dollar terms, in District per capita income associated with a one dollar change at the national level?" This is termed the "income change" effect. Answers to these questions were determined mathematically by using simple linear regressions.

Results of the regression analysis show that for the 1950-1965 period

Chart I: Personal Income
Sixth District and United States
1950-65



Expected Changes in Per Capita Personal Incomes Associated with National Changes

| Area | Change expected when U.S. per capita income changes by | |
|----------------|--|--------|
| | 1 percent | \$1.00 |
| Alabama | 1.3 | \$0.84 |
| Florida | 1.1 | .93 |
| Georgia | 1.3 | .92 |
| Louisiana | 1.1 | .77 |
| Mississippi | 1.2 | .66 |
| Tennessee | 1.2 | .81 |
| Sixth District | 1.2 | .87 |

an annual rate of change of 1 percent in national per capita income was associated with a 1.2-percent change in the District's per capita income. In other words, the District's rate of change was greater than the nation's. Responses varied somewhat among the District states. In Alabama, for example, a 1.3-percent change in per capita income was associated with a change of 1 percent in national per capita income, whereas the figure for Louisiana and Florida was 1.1 percent. In each of the District states, however, the rate of change was greater than the corresponding national rate.

On the other hand, computations show that the actual change, expressed in dollar terms, in national per capita income was accompanied, on average, by a smaller dollar change in the District states. When the nation's per capita income changed by one dollar, the expected change in the District's per capita income was 87 cents. The expected changes varied among District states, ranging from a high of 93 cents in Florida to a low of 66 cents in Mississippi. In all the states, however, the expected "income change" effect was less than one dollar.

The reason for the contrast between the relative position of the changes in the District, measured by the "income flexibility" and the "income change" effects, is caused by the lower levels of per capita income in the District states. Although per capita income in this region has advanced relative to the nation, a gap of over \$600 still remains. Thus, by starting at a lower level, a given dollar change has more impact, expressed as a percentage change, in this region than nationally. Nevertheless, the

District's greater-than-national rate of change was not large enough to narrow the dollar gap.

For an actual change ("income change" effect) in the District's per capita income to equal a national per capita income change would require, on average, an "income flexibility" effect of about 1.4 percent, instead of the 1.2 percent found from the 1950-1965 relationship. Thus, with an "income flexibility" effect of 1.4 percent, the dollar gap between District and national per capita incomes would have remained approximately the same over this period. With a value less than 1.4 percent, the gap could be expected to widen, as it did from 1950 to 1965. To narrow or eliminate the gap already existing would require a still larger "income flexibility" value.

Thus, while the District's rate of per capita income growth has generally exceeded the nation's, it has not been great enough to narrow the dollar gap between District and national per capita incomes.

Responding to Local and National Changes

The "income flexibility" and "income change" effects help explain the reaction of District per capita income normally expected from a change in national per capita income. However, despite the very definite and obvious "tie-in" between changes in District and national incomes, there are reasons why an income change for some specific year may not resemble past ones. A difference in the industrial-mix of the District's economy, which could result in a differential impact from a shift in the national demand for various products or specific local developments, could cause a more divergent swing in income than would normally be expected.

The sources of total personal income in the District have become increasingly more similar to the national pattern. Agricultural income, once a more important source of District income, now accounts for the same proportion as in the nation. But important differences still remain. Manufacturing income makes up 22 percent of the nation's income, but only 17 percent of the District's. On the other hand, governmental sources contribute a larger proportion of the District's income.

Since various types of activity respond differently to general economic changes, we would not expect two areas with dissimilar industry mixes to always behave alike. The larger the area, the more likely will its economy be diversified and resemble the national economy. Thus, income changes for the entire Sixth District more nearly resemble national changes that do most of the states considered separately.

What specific local factors cause the District states to respond differently to changes in national personal income than would normally be expected? The answer to this question, along with the overall national income picture, has an important bearing on the change in District incomes in specific years. The use of linear regressions also helps in answering this question. Specifically, the regression technique seeks to determine the year-to-year change in the District states' total personal income associated with a corresponding change at the national level. Total personal income is used since it is necessary to look at the influences of the various sources of income for specific years in explaining why deviations from the national trend occur.

Using data for the 1950-1965 period, we determined the historical relation between U.S. and District income changes. About four-fifths of the yearly swings in District income could be explained directly by changes in the level of national personal income. Such a relation represents an average association between yearly income changes in District states and the entire nation. Deviations in specific years from this average relation reflect the influence of certain local factors. Thus, a comparison of the actual yearly changes in a state's income, with the changes computed from this historical relation, help pinpoint the years in which these local factors were particularly important. The most notable deviations occurred during the Korean War buildup of 1950-1951, the recession years of 1957-1958 and 1960-1961, and recently in 1963 (see charts).

In 1951, the change in District income calculated from this historical relation was about 24 percent higher than that actually realized. Most of this deviation came from Florida's actual change in personal income falling considerably short of her predicted change. Closer examination reveals that income from Federal military expenditures in Florida did not expand as rapidly as in other regions of the nation during the Korean War buildup. Income derived from this source advanced about 55 percent in Florida in 1951, compared with 72 percent in the nation. Other District states' income changes were about in line with their expected value.

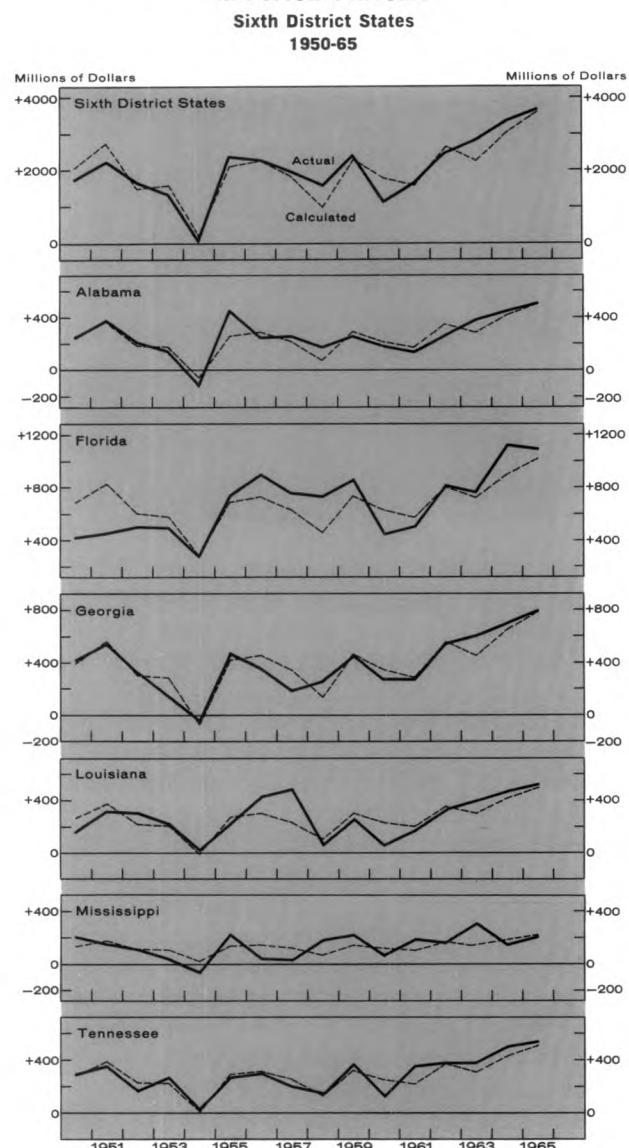
A movement in the opposite direction occurred in the 1957-1958 period, as the actual change in District income was considerably above the calculated value. Deviating from the 1950-1961 period, most of the District states experienced the same trend. During 1957-1958, incomes rose only moderately. The slower rate of advance at the national level, however, was more severe than in the District, as income from mining, construction, and manufacturing in the nation fell sharply. The District fared much better than did most other areas, as personal income rose by 5.1 percent, compared with only a 2.5-percent rise for the nation.

It is tempting to conclude that the District's economy is more stable than the nation's during recessions. But let us first look at the District's performance during the 1960-1961 recession, when realized income changes in each of the six states, fell short of the changes expected from the national trend.

District income from agricultural sources fell by 2 percent in 1960, while the nation experienced a 2-percent advance. Prices received for cotton, a major cash crop in the District, were down considerably. Since a large proportion of the nation's cotton is produced in the Southeast, a drop in the price of this commodity adversely affected District farm incomes. In addition, farm income in Louisiana dropped sharply because of poor weather and generally falling prices for most commodities. Total farm cash receipts in that state declined nearly 5 percent during the year.

Construction activity in the nation also weakened, but moderate gains in incomes from this source were still maintained. The construction industry's contribution to District income declined in 1960, mainly in Louisiana where a 6.5-percent drop was experienced. The closing of certain military bases in southwest Louisiana augmented

Chart II: Actual and Calculated Changes in Personal Income



declines in this industry. In New Orleans alone, the value of residential construction dropped nearly 30 percent. Declines were also recorded in Baton Rouge and Lake Charles.

Thus, deviations from actual and expected changes in District income during the recession year of 1960 were centered largely in only two industries. These special and occasional factors are mainly responsible for causing District income to fluctuate more or less than the national trend in certain years.

Since the recession of 1960-1961, gains in District income each year have moved steadily upward. The same pattern emerges for the nation, except in 1963 when income growth was not as rapid as the year before. Income from agriculture actually declined in 1963 in the nation, while large gains were sustained in the District. In fact, each of the major sources of income grew more rapidly in the District. Particularly noteworthy was the 7.1-percent increase in Federal military income, compared with only a 1.6-percent rise for the nation.

Within certain states, other factors occasionally cause
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has declined much less. In 1950 lumber and wood products accounted for only 10 percent of the nation's employment in durable goods, whereas it accounted for 59 percent of Louisiana's. Today the state's percentage has fallen to 22 percent. In 1950, food and kindred products made up 25 percent of the nation's nondurable goods employment; in Louisiana it accounted for 40 percent. Today the Louisiana percentage is down to 36 percent.

When investment is up, the relative importance of these comparatively low-paying industries becomes less. With investment high in recent years, the reduction in the importance of food and kindred products has continued unabated, although there has been a slight rise in the actual employment level in this industry since 1963.

Economic Outlook

Despite some weaknesses in Louisiana's economy, prospects for the continuation of the current level of activity in the Bayou state for the rest of the year seem likely. But whatever happens, it seems reasonable to expect that, because the state's industrial structure remains rather fluctuation prone, Louisiana will continue to experience the "roller coaster effect."

CAROLE E. SCOTT

This is one of a series in which economic developments in each of the Sixth District states are discussed. Developments in Alabama's economy were analyzed in the July 1966 REVIEW, and a discussion of Mississippi's economy is scheduled for a forthcoming issue. Copies of the revised editions of A REVIEW OF GEORGIA'S ECONOMY, 1960-66, and A REVIEW OF TENNESSEE'S ECONOMY, 1960-66, are now available upon request to the Research Department, Federal Reserve Bank of Atlanta, Atlanta, Georgia 30303.

Bank Announcements

On July 11, THE BEACH BANK OF VERO BEACH, Vero Beach, Florida, opened as a nonmember bank and began to remit at par for checks drawn on it when received from the Federal Reserve Bank. Officers include L. S. Tiller, President, and W. H. Hicks, Vice President and Cashier. Capital totals \$300,000, and surplus and other capital funds, \$105,000.

The CITIZENS BANK, Warrenton, Georgia, a nonmember bank, began to remit at par on August 1.

A newly organized nonmember bank, the SPRINGFIELD COMMERCIAL BANK, Springfield, Florida, opened on August 3 and began to remit at par. Officers are M. G. Nelson, President; Hugh A. Nelson, Vice President; and Bobby M. Pitts, Cashier. Capital amounts to \$200,000, and surplus and other capital funds, \$60,000.

On August 15, THE BANK OF COMMERCE AND TRUST COMPANY, St. Francisville, Louisiana, a nonmember bank, began to remit at par.

The FIRST NATIONAL BANK OF WAYNESBORO, Waynesboro, Mississippi, opened on August 23 as a member bank and began to remit at par. O. D. Mason, Jr., is President, and Mrs. Opal Givens is Cashier. Capital is \$200,000, and surplus and other capital funds, \$300,000.

The MID-WAY BANK, Opelika, Alabama, a newly organized nonmember bank, opened on August 30 and began to remit at par. The officers are Sam Morgan, Jr., President, and Jack Anderson, Vice President. Capital totals \$175,000, and surplus and other capital funds, \$175,000.

As the Nation Goes...

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large deviations between the actual and calculated changes in income. Generally, however, changes in Alabama, Georgia, and Tennessee closely parallel those of the entire nation. Florida, with about one-fourth of her income coming from the trade and service sector, is very vulnerable to sudden changes in income. The accompanying charts also show that, of any District states, Mississippi is probably the least tied to national developments in specific years.

Future Income Changes

Based on historical relations, the best indicator of the likely change in the District's income is what happens at the national level. But in appraising the likely income change in the District for some specific year, we are also reminded that "as the nation goes, the South does not always follow." Certain local factors, such as a drought or a storm, may cause the agricultural sector's contribution to District income to move differently from that of other areas. The impact of government spending, especially for defense, may affect District income differently than in the nation. Other factors, such as the development of local natural resources or shifting national demands, may result in a differential impact on District income. It would be rare if local income changes behaved exactly like a change at the national level.

The task of forecasting a state's income would be considerably easier if it were only necessary to look at the national trend. In addition to the underlying national influences, a multitude of local factors must also be considered. In an effort to improve his estimates, the Southerner who forecasts his state's income must be familiar with the separate influences of these local developments and incorporate them into his predictions.

JOE W. MCLEAR

Notes on Regression

Simple regression analysis measures the relationship between two variables. For our purposes, the relationship was assumed to be linear, i.e., one represented by a straight line of the form $Y = a + bX$, where (X) and (Y) are the related variables and (a) and (b) are the coefficients to be determined. The (b) coefficient determined from the analysis represents an estimate of the average amount by which the two variables are related; the (a) coefficient is a constant and serves to adjust the line up or down according to the initial level of the two variables.

First of all, we computed the relationship of changes in per capita income between the U.S. and the District and between the U.S. and individual District states for the years 1950-1965. In this case, (Y) represents the change from the previous year in the District states' per capita income and (X) the change from the previous year in U.S. per capita income. Both of the variables are expressed in actual dollar changes. The results of the analysis were:

| | Coefficient of Determination R ² | Standard Error of Estimate | Standard Error of b Coefficient |
|----------------------------------|--|----------------------------|------------------------------------|
| Alabama: $Y = -2.00 + 0.84X$ | .87 | 18.2 | .042 |
| Florida: $Y = -1.30 + 0.78X$ | .82 | 18.5 | .045 |
| Georgia: $Y = -1.10 + 0.92X$ | .87 | 20.6 | .045 |
| Louisiana: $Y = -3.51 + .77X$ | .72 | 32.0 | .045 |
| Mississippi: $Y = -1.00 + 0.66X$ | .64 | 26.6 | .041 |
| Tennessee: $Y = -1.73 + 0.81X$ | .84 | 17.4 | .046 |
| District: $Y = -1.86 + 0.87X$ | .90 | 16.9 | .038 |

The coefficient of determination, which measures the percentage of the total variation in (Y) explained by the corresponding variation in (X), indicates a high degree of association between the two variables in each state. The standard error of estimate shows the average amount by which the actual (Y) value deviated from the regression line. With the exception of Mississippi, the standard errors of estimate were considerably smaller than the mean of their respective (Y) values. The mean value of Mississippi's per capita income changes was only about twice as large as her standard error. Each of the (b) coefficients was sig-

nificantly larger than the standard error, meaning that the estimated coefficients are reliable estimates for this sample.

The (b) coefficients shown in the above equations relate by how much (Y) should change with a given change in (X), expressed in dollar terms. These actual changes are converted to an expected percentage change by multiplying each of the coefficients by the ratio of the average level of U.S. per capita income to the average level of each of the various states' per capita income for the 1950-1965 period. These percentage changes are shown in an accompanying table of the text.

A second set of regressions was determined for each of the states using changes in total personal income (expressed in millions of dollars) instead of per capita personal income. The results of the analysis were:

| | Coefficient of Determination R ² | Standard Error of Estimate | Standard Error of b Coefficient |
|------------------------------------|--|----------------------------|------------------------------------|
| Alabama: $Y = -90.75 + .017X$ | .79 | 68.7 | .002 |
| Florida: $Y = 237.23 + .022X$ | .49 | 170.3 | .007 |
| Georgia: $Y = -123.35 + .026X$ | .85 | 79.9 | .005 |
| Louisiana: $Y = -33.92 + .015X$ | .59 | 98.1 | .002 |
| Mississippi: $Y = -100.00 + .006X$ | .26 | 80.0 | .001 |
| Tennessee: $Y = -18.67 + .015X$ | .79 | 59.4 | .002 |
| District: $Y = -19.17 + .022X$ | .84 | 336.2 | .009 |

The coefficients of determination for the equations for Alabama, Georgia, Tennessee, and the District were fairly high. Lower values for the remaining states indicate their lower degree of association with U.S. income changes. The (b) coefficients, judging by the small size of their standard errors, were highly significant. Standard errors of estimate for each equation were considerably smaller than the mean of the associated (Y) value.

Using these equations, the year-to-year change in each state's income was calculated from the change occurring in U.S. income. These calculated values are plotted in the accompanying charts, along with the actual changes which occurred.