The Tenth District and National Business Cycles

By Dale N. Allman

How great is the impact of a national business cycle on the economies of the states of the Tenth Federal Reserve District? This question, of the comparative strength of the Tenth District economy during business cycles, is important again at the beginning of 1981, following a year which included both the end of a long business cycle expansion and—perhaps—the end of the shortest recession of the post-World War II era.

The purpose of this article is to examine how sensitive the economies of the Tenth District states were to national business cycles in the decades of the 1960s and 1970s, and to see how they fared in the very sharp downturn of early 1980.

In order to determine the responsiveness of the Tenth District and its individual states to national business cycles, the rates of growth in their economic activity are compared to the national growth rate. Such comparisons are used to show the extent to which the states responded to, or participated in, national recessions and recoveries, and are not intended to represent state or regional business cycles as such.

Income growth is used as the measure of economic activity in this article because broader measures of economic activity such as gross product, or output, are not available on a state-by-state basis. More specifically, wage and salary income and proprietors' income in the nonfarm sector (hereafter called "nonfarm earnings") is the indicator used in the analysis. Sources of personal income other than nonfarm earnings are excluded because fluctuations in it often occur because of exogenous influences (such as changes in weather conditions) which are not directly related to the dynamics of the national business cycle. Transfer payments are excluded because they are not payments for participation in current economic activity. Property income (dividends, interest, and rent) is excluded because it is not clearly assignable to subnational geographic areas—i.e., property income in a Tenth District state is not as clearly assignable to economic activity there as are wages and salaries and proprietors' income. (Nonfarm wages and salaries and proprietors' income in 1979 made up 72 per cent of total

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personal income in the seven states of the Tenth Federal Reserve District.[1] Farm income in 1979 was 5 per cent of total personal income.)

The period examined in this article, from the first quarter of 1960 through the first quarter of 1980, includes three peak-to-peak national business cycles.[2] In total, there were 14 quarters of recession and 67 of expansion. The three peak-to-peak cycles included are those from 1960:I to 1969:III, from 1969:III to 1973:IV, and from 1973:IV to 1980:I.

Several sets of comparisons of growth rates of nonfarm earnings in the Tenth District states with those of the nation were made in an attempt to assess the sensitivity of economic activity in those states to national business cycles. First, the average growth rates were compared for all 67 expansion periods and for all 14 recession periods. Next, growth rates were compared for each of the three completed business cycles included in the period under review. In making some of the comparisons, a simple indicator called the "cyclical swing" was used. The cyclical swing is the percentage point difference between an expansion growth rate and a recession growth rate in nonfarm earnings.

A comparison of cyclical swings shows how sensitive a particular area's economy has been to national business cycles. An area with a swing in growth rates from recession to expansion that is larger than the nation's swing is identified as cyclically sensitive. Conversely, a swing smaller than the nation's identifies an area as relatively insensitive to the national cycle.

A number of reasons may exist for states and regions to have different degrees of sensitivity to national business cycles. One of the most important is that of different industrial structures producing different output mixes. Such differences in industrial structure between the United States and the Tenth District will be discussed here.

AVERAGE DISTRICT SENSITIVITY

The average response of the Tenth District economy over the entire 81-quarter period to national business cycles will be examined in this section. First, nonfarm earnings growth in the District will be compared to national growth during the separate phases of the cycle. Next, the average change in growth rates over the complete cycle, the cyclical swing, will be compared to the national change. These comparisons will permit some conclusions about the average sensitivity of economic activity in the Tenth District to national recessions and expansion during the 1960s and 1970s. The average growth rates of nonfarm earnings during the last three national expansions and recessions for the United States, the Tenth District, and the individual states in the District are presented in Table 1, as are the cyclical swings in nonfarm earnings growth during the last three complete business cycles.

Expansion Growth Rates

During the last three national expansions, the average annual growth rate of nonfarm earnings was about the same in the United States (8.8 per cent) and in the Tenth District (8.9 per cent). For the individual states in the District, the average growth rates of nonfarm earnings during national expansions were within 1 percentage point of the national average in five of the seven states (Missouri,

[1] The Tenth Federal Reserve District includes Nebraska, Kansas, Wyoming, Colorado, and parts of Missouri, Oklahoma, and New Mexico.

[2] Cyclical peaks and troughs in national economic activity are identified here by peaks and troughs in Gross National Product in 1972 dollars. For example, the second quarter of 1975 is identified as the initial quarter of the most recently ended expansion, and the first quarter of 1980 is identified as its final quarter.

Table 1

NONFARM LABOR AND PROPRIETORS' INCOME: AVERAGE QUARTERLY PER CENT CHANGE, AT ANNUAL RATES

1960:I to 1980:I

	Expansions	Recessions	Cyclical Swing
United States	8.8	5.2	3.6
Tenth District	8.9	6.7	2.2
Missouri	8.1	4.8	3.3
Kansas	8.6	6.3	2.3
Colorado	10.7	8.6	2.1
New Mexico	9.1	7.3	1.8
Oklahoma	9.5	8.0	1.5
Nebraska	8.2	7.9	0.3
Wyoming	10.2	10.9	-0.7

SOURCE: Unpublished income data, Bureau of Economic Analysis, U.S. Department of Commerce.

Nebraska, Kansas, New Mexico, and Oklahoma). In those states, nonfarm earnings growth during expansions ranged from 8.1 per cent in Missouri to 9.5 per cent in Oklahoma. Nonfarm earnings in the two remaining states, Colorado and Wyoming, grew at an average annual rate of more than 10 per cent during national expansions in the 1960s and 1970s.

In the expansion phases of the last three national business cycles, therefore, nonfarm earnings in Tenth District states increased at an average rate close to or above that of the United States. But how does economic activity in the District respond to national recessions?

Recession Growth Rates

The average growth rates of nonfarm earnings during national recessions indicate that economic activity in the Tenth District and in the individual states in the District did not slow as much as in the nation. In the Tenth District, nonfarm earnings grew during recessions at an average growth rate of 6.7 per cent, compared to 5.2 per cent in the United States (Table 1). The average recession growth rate of nonfarm earnings in all District states except Missouri was also greater than in the nation. Missouri nonfarm earnings grew at an average annual rate of 4.8 per cent, a growth rate only slightly smaller than the national rate. In the other six District states, growth ranged from 6.3 per cent in Kansas to 10.9 per cent in Wyoming. This comparison of growth rates of nonfarm earnings during the last three national recessions indicates that economic activity in the Tenth District and in most District states was less affected by national recessions than other areas of the country.

Cyclical Swing

The cyclical swing in nonfarm earnings growth—the difference between the average growth rate in expansions and the average growth rate in recessions—amounted to 3.6 percentage points in the last three business cycles in the United States (Table 1). The Tenth District cyclical swing was 2.2 per cent in the last three business cycles, smaller than in the nation. The District state with the largest difference in average growth rates was Missouri, whose cyclical swing of 3.3 was only slightly less than that of the United States. The other six District states had cyclical swings considerably smaller than the national cyclical swing. Wyoming actually had a negative cyclical swing in nonfarm earnings growth rates, indicating that the average recession growth rate was greater than the average expansion growth rate in that state during the 1960s and 1970s.

In brief, during the last three national business cycles, the average growth of nonfarm earnings in the Tenth District and District states has been similar to that of the United States in expansion phases of the cycle. In the recession phases of the cycle, nonfarm earnings in the District grew at an average rate faster than in the nation. The higher average growth rate during recessions suggests that the economies of the Tenth District and most District states have not been very responsive to national recessions. Also, for the Tenth District as a whole, the cyclical swing in earnings growth rates was well below the national average, indicating that the District was relatively insensitive to the last three business cycles.

DISTRICT RESPONSE TO INDIVIDUAL CYCLES

The preceding comparisons between expansion growth rates and recession growth rates of nonfarm earnings used average rates for the last three national cycles as a whole. The resulting cyclical swings indicated that the Tenth District and six of the seven states in the District were on average relatively insensitive to national cycles. How did the District respond to each of those three cycles individually? Are there differences in response from cycle to cycle? To answer these questions, the same type of comparison between expansion growth rates and recession growth rates can be made for each individual business cycle. More specifically, the cyclical swing in the Tenth District and District states can be evaluated relative to the national cyclical swing in each of the three cycles, and that relationship betweeen cyclical swings can then be used to identify the sensitivity of the District to those individual cycles,

The 1960s

The peaks and troughs in real GNP establish the first national cycle in the period, beginning in the first quarter of 1960 and ending in the third quarter of 1969 and spanning 39 quarters of economic activity. Table 2 presents the growth rates of nonfarm earnings during the 35 quarters of expansion and the 4 quarters of recession included in that business cycle.

In the expansion phase of the 1960s business cycle, the growth of nonfarm earnings in the United States was slightly more than 7 per cent at an annual rate. The Tenth District expansion growth rate was slightly less than 7 per cent. Among District states, only Colorado and Oklahoma grew at a rate equal to or greater than that of the United States. Nonfarm

Table 2

NONFARM LABOR AND PROPRIETORS' INCOME: AVERAGE QUARTERLY PER CENT CHANGE, AT ANNUAL RATES

1960:I to 1969:III

	Expansion 1960:IV-1969:III	Recession 1960:I-1960:IV	Cyclical Swing
United States	7.3	2.2	5.1
Tenth District	6.8	3.0	3.8
Colorado	7.7	5.4	2.3
Kansas	6.2	2.3	3.9
Missouri	7.0	1.8	5.2
Nebraska	6.4	6.8	-0.4
New Mexico	5.4	1.8	3.6
Oklahoma	7.3	2.1	5.2
Wyoming	4.7	3.2	1.5

SOURCE: Unpublished income data, Bureau of Economic Analysis, U.S. Department of Commerce.

earnings in the remaining District states grew during that expansion at a rate smaller than the national rate. The District response to the expansion phase of the 1960s cycle was thus different from the average response to all three business cycles in that the growth rate of nonfarm earnings in most District states was slightly less than in the United States.

During the recession quarters of the 1960s cycle, the growth of nonfarm earnings in the nation slowed to slightly more than 2 per cent at an annual rate. Nonfarm earnings growth in the Tenth District in that recession slowed to a rate of only 3 per cent. The recession growth rates of nonfarm earnings in Oklahoma, New Mexico, and Missouri were slightly less than in the nation. In the other four District states, the growth rate in the 1960s recession was greater than the national growth rate. Thus, the response to the recession phase of the 1960s cycle was also somewhat different from the average response to all cycles in that there were three District states with recessions growth rates below the national rate.

In the 1960s business cycle, the cyclical swing in the nation's nonfarm earnings growth amounted to 5.1 percentage points. The change in growth rates during the 1960s cycle in the Tenth District, which amounted to a cyclical swing of 3.8 per cent, was 1.3 percentage points less than in the nation. Among District states, Oklahoma and Missouri had cyclical swings about equal to the nation; all other District states had cyclical swings less than the United States swing. (Nebraska's cyclical swing in the 1960s cycle was negative, as nonfarm earnings in that state grew at a slightly faster rate during the recession than the expansion.)

On the basis of cyclical swings, Oklahoma and Missouri can be classified as being relatively sensitive to the 1960s business cycle. The economies of the other five states, and of the Tenth District as a whole, were relatively insensitive to the 1960s cycle.

The 1970s

Tables 3 and 4 present similar expansion and recession growth rates and cyclical swings for the two business cycles that occurred during the 1970s. During the 13 quarters of expansion in the cycle that began in the third quarter of 1969 and ended in the fourth quarter of 1973, nonfarm earnings grew at an annual rate of about 9 per cent in the United States. The growth rate during the six quarters of recession in the early 1970s was a little more than 5 per cent. For that business cycle, the United States cyclical swing was 3.8 percentage points. The Tenth District economy was relatively insensitive to the cycle of the early 1970s, as

Table 3

NONFARM LABOR AND PROPRIETORS' INCOME: AVERAGE QUARTERLY PER CENT CHANGE, AT ANNUAL RATES

1969:III to 1973:IV

	Expansion 1970:IV-1973:IV	Recession 1969:III-1970:IV	Cyclical Swing
United States	9.1	5.3	3.8
Tenth District	9.7	7.0	2.7
Colorado	13.7	10.8	2.9
Kansas	9.8	4.4	5.4
Missouri	7.6	6.1	1.5
Nebraska	9.4	7.0	2.4
New Mexico	11.1	6.5	4.6
Oklahoma	9.3	7.8	1.5
Wyoming	13.3	6.6	6.7

SOURCE: Unpublished income data, Bureau of Economic Analysis, U.S. Department of Commerce.

shown by a Tenth District cyclical swing of only 2.7 percentage points.

The expansion growth rates of nonfarm earnings in the early 1970s were greater than the national rate in all District states except Missouri. Missouri nonfarm earnings, however, grew faster than the national rate during the recession of the early 1970s. In that recession, Kansas was the only District state whose growth in nonfarm earnings was below the national rate. As a result, the Kansas economy responded to the early 1970s cycle with a cyclical swing greater than that of the United States. The cyclical swings in Wyoming and New Mexico were also greater than the nation's, even though the expansion and recession growth rates were both above the national growth rates in both states. The Tenth District as a whole and the remaining four District states (Colorado, Nebraska, Missouri, and Oklahoma) all had swings less than the United States, suggesting that those areas did not respond to the early 1970s cycle as much as did Wyoming, Kansas, and New Mexico.

Table 4

NONFARM LABOR AND PROPRIETORS' INCOME: AVERAGE QUARTERLY PER CENT CHANGE, AT ANNUAL RATES

1973:IV to 1980:I

	Expansion 1975:I-1980:I	Recession 1973:IV-1975:I	Cyclical Swing
United States	11.0	7.0	4.0
Tenth District	12.2	9.0	3.2
Colorado	13.8	8.6	5.2
Kansas	12.0	10.8	1.2
Missouri	10.3	5.6	4.7
Nebraska	10.5	9.5	1.0
New Mexico	14.0	11.6	2.4
Oklahoma	13.4	12.0	1.4
Wyoming	17.7	20.2	-2.5

SOURCE: Unpublished income data, Bureau of Economic Analysis, U.S. Department of Commerce.

The business cycle that occurred in the latter part of the 1970s began in the fourth quarter of 1973 and ended in the first quarter of 1980. During the 21 quarters of expansion in that cycle, the growth of nonfarm earnings in the United States was 11 per cent at an annual rate. In the six recession quarters, nonfarm earnings grew at a 7 per cent rate in the nation, resulting in a cyclical swing of 4 percentage points. Among Tenth District states, the response to the late 1970s cycle was greatest in Missouri and Colorado, where the cyclical swing was greater than in the United States. The nature of the cyclical swing differed in those two states, however. The expansion and recession growth rates were both greater than the national growth rates in Colorado, but in Missouri they were both less than the national rates.

The Tenth District as a whole and the other five District states had cyclical swings less than in the United States during the late 1970s business cycle. In all of those areas except Nebraska, the expansion growth rate of nonfarm earnings was greater than in the nation, while the recession growth rates were greater than nationally in all areas.

Although the District response to the three individual business cycles in the 1960s and the 1970s varied from cycle to cycle and from area to area, some generalizations may be made. First, the Tenth District as a whole was relatively insensitive to all three business cycles: the District's cyclical swing in each cycle was less than that of the United States. In both cycles of the 1970s, Tenth District nonfarm earnings outpaced U.S. growth in both the expansion and the recession phases. In the 1960s, Tenth District nonfarm earnings grew faster than the nation's during recession, and very nearly kept pace during the expansion phase. Second, Nebraska is the only state in the District that was similarly insensitive to all of the last three national business cycles. Third, Missouri was the only District state that was relatively sensitive to more than one of the threee individual cycles, i.e., Missouri's cyclical swing was greater than the nation's in two of the three cycles. Finally, only a small minority of District states failed to keep pace with national earnings growth in either the expansion or recession phases of both cycles of the 1970s. A slightly larger group of states fell behind the national pace in both the expansion and the recession of the 1960s.

INDUSTRIAL STRUCTURE AND BUSINESS CYCLE RESPONSE

Variations in the effect of national business cycles on individual regions and states have been determined to depend significantly on regional variations in industrial composition.[3] Regions with a large share of total earnings attributable to industries whose activity varies greatly over the business cycle are most responsive to national cyclical changes. For example, the cyclical swing has been greater in the Great Lakes states than in any other region, principally because of the greater importance there of durables manufacturing—an industry that is particularly susceptible to the ups and downs of the business cycle.

Do the Tenth District and its states have industrial structures that are less cyclically sensitive than that of the national economy? The most cyclically sensitive sector of the national economy is the manufacturing sector. Its average contribution to total nonfarm earnings nationally was more than 28 per cent in the 1960s and 1970s. In the Tenth District as a whole the manufacturing sector contributed a smaller share (21 per cent) to earnings than it did for the nation; the same was true for all District states but Missouri.

Mining was the least cyclically sensitive sector of the national economy in the 1960s and 1970s, followed by the government sector. Both of these sectors made up a larger share of the Tenth District economy than of the national economy. (The same was true of all District states except for Missouri and Nebraska in the case of the mining sector, and for Missouri in the case of the government sector.) Together, mining and government averaged nearly 23 per cent of total nonfarm earnings in the Tenth District, compared to about 18 per cent for the nation.

In the Tenth District as a whole, and for most District states, the relatively greater contribution to total nonfarm earnings of the least cyclically sensitive industries (mining and government), and the relatively smaller contribution of the most cyclically sensitive industry (manufacturing), help to explain the comparative insensitivity to national business cycles of the region's economy.

There may be changes over time in the sensitivity of a region to national business cycles. If such regional sensitivity depends significantly on differences in industrial structure, a region that is relatively insensitive to national cycles may become more sensitive if its industrial structure becomes more like the nation's. There has apparently been a slight tendency of that sort in the case of the Tenth District and most of its states since 1960. During that period, manufacturing earnings grew faster than the national rate in the Tenth District as a whole and in all its states save

[3] Lynn E. Browne, "Regional Industry Mix and the Business Cycle," *New England Economic Review*, November/December 1978, pp. 35-53.

Missouri and Wyoming. At the same time, earnings from the government sector grew more slowly in the Tenth District and in all seven of its states except Missouri. Because of these differential rates, the industrial structure of the Tenth District may be becoming more like that of the United States, and hence more cyclically sensitive over time. There does appear to be some closing of the differences in industrial composition over the last two decades, as far as the most sensitive and least sensitive industries were concerned. And at the same time, the difference in cyclical swings between the United States and the Tenth District has lessened from the cycle of the 1960s to that of the late 1970s. While these tendencies appear to be present, this analysis does not provide a clear-cut resolution of whether the Tenth District is becoming more sensitive to national business cycles.

DISTRICT RESPONSE TO THE 1980 DOWNTURN

The first quarter of 1980 was the last quarter of real GNP growth in the expansion that began in early 1975. In that quarter, U.S. nonfarm earnings grew at an annual rate of 10.6 per cent, about the same as the Tenth District growth rate of 10.9 per cent. Growth in Kansas, Missouri, and Nebraska was slower than the national rate, while in Oklahoma earnings grew only slightly faster than for the nation. The District's three mountain states, however, posted earnings growth from about 2.5 to nearly 12 percentage points greater than the nation (Table 5).

The second quarter of 1980 brought the largest post-World War II decline in real GNP —a 9.9 per cent annual rate. U.S. nonfarm earnings growth also was off sharply, increasing (in nominal terms) at a 1.5 per cent annual rate. Earnings growth for the District also was off sharply as a result of the recession but, at a 2.9 per cent rate, remained slightly greater than for the United States. The range of state rates of earning growth was very wide in the recessionary second quarter —from small declines in Kansas and Missouri to an increase in Oklahoma greater than that state achieved in the first quarter of the year.

The Tenth District as a whole apparently was still relatively insensitive to national recession in the second quarter of 1980, as indicated by a comparison of growth in nonfarm earnings. But nominal declines occurred in Kansas and Missouri, suggesting perhaps a sharper reaction to the national downturn. At the same time, the remaining five District states showed earnings growth faster than the United States, with growth in New Mexico, Wyoming, and Oklahoma considerably faster. Yet second

Table 5

NONFARM LABOR AND PROPRIETORS' INCOME: AVERAGE QUARTERLY PER CENT CHANGE, AT ANNUAL RATES

	1980:I	1980:II	Cyclical Swing
United States	10.6	1.5	9.1
Tenth District	10.9	2.9	8.0
Colorado	15.8	2.0	13.8
Kansas	7.7	-0.3	8.0
Missouri	8.4	-1.0	9.4
Nebraska	7.8	3.5	4.3
New Mexico	13.0	6.3	6.7
Oklahoma	11.0	11.3	-0.3
Wyoming	22.4	6.7	15.7

SOURCE: Unpublished income data, Bureau of Economic Analysis, U.S. Department of Commerce.

quarter growth in the three mountain states was significantly slower than in the first quarter, indicating that—compared to their own earlier record—a reduced pace of economic activity was also felt there.

SUMMARY

Comparisons of growth rates in nonfarm earnings support the view that economic activity in the Tenth District was relatively insensitive to national business cycles during the 1960s and 1970s. This comparative insensitivity to national expansions and recessions is at least partly explained by an industrial structure in the Tenth District that is more weighted toward mining and government, and less toward manufacturing, than is the U.S. economy. While the District certainly felt the reduced pace of economic activity in the spring of 1980, it continued to be less responsive to national cyclical change than some other parts of the country.

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