

Slowdown in Georgia Manufacturing: A Shift-Share Analysis

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The Fifties and Sixties showed Georgia's economy gaining on that of the U. S. at a rapid pace. In terms of both total and per capita personal income, this twenty-year period witnessed Georgia narrowing the gap with the United States.

The state's total personal income growth from 1967 to 1972 was over 20 percent greater than the nation's. However, manufacturing wage and salary disbursements in Georgia and the U. S. increased at an equal pace over this same period.

While Georgia is not primarily known as an industrial state, manufacturing wages and salaries made up 26.7 percent of the total of such disbursements in 1972. The U. S. counterpart was 28.2 percent in that year.

Thus, although the data suggest that Georgia's economy is growing faster than the nation's, its manufacturing sector is similar to the nation's. One might conclude that the state's manufacturing sector would be susceptible to national manufacturing trends.

The refinement of Georgia's Industrial Production Index (see this **Review**, May 1973) enables a further assessment of manufacturing's role in the state's economic growth.

The shift-share technique, previously used to analyze regional income and employment growth, has been adapted here to examine Georgia manufacturing trends.¹ The implications of this analysis are then considered in examining the state's manufacturing performance during the current economic slowdown.

Explaining Regional Growth

What causes regional manufacturing growth? First, there is the "national growth effect," which says that national economic growth will pull the region along

¹For a good discussion and illustration of the shift-share technique, see Robert B. Bretzfelder, "Geographic Trends in Personal Income in the 1960's," *Survey of Current Business*, U. S. Department of Commerce, August 1970. For an analysis applied to employment trends, see David Jones and Paul Miller, "Regional Growth and Industrial Change in Ohio: A Shift-Share Analysis," *Bulletin of Business Research*, Center for Business and Economic Research, Ohio State University, July 1973.

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USING THE SHIFT-SHARE ANALYSIS

The technique of shift-share analysis makes it possible to identify and quantify the three major sources of regional growth by comparing similar national and regional data. Previous applications have analyzed income and employment changes. This article uses the shift-share technique to compare Georgia's Manufacturing Production Index developed at the Federal Reserve Bank of Atlanta and the national industrial production index developed and maintained by the Board of Governors of the Federal Reserve System. The 1973 indexes are shown in Columns G and H of Table 1.

Shift-share analysis compares **changes** in data to determine sources of growth, as explained below. Since both production indexes are based on the year 1967 (1967 = 100), the 1973 index values represent the percent changes since the base year. The results of the shift-share changes between the production indexes can thus be applied to the 1967 value added in Georgia manufacturing (in constant dollars) to yield a quantitative measure of national growth, industrial mix, and regional share effects. The calculations are as follow:

The **national growth effect** is calculated by applying to the 1967 value added (Column A, Table 1)¹ for each Georgia industry the percentage change in overall national industrial production (26.4 percent)² between 1967 and 1973.

¹Value added measures increments to manufacturing value. In this concept, for example, a textile product manufactured and sold in Georgia for \$500 but containing materials worth \$200 purchased from outside the state or from outside the textiles industry would show a Georgia textiles manufacturing value added of \$300. Throughout this article, value added is expressed in constant (1963 = 100) dollars.

²The total index growth for the U. S. shown at the bottom of Column H has been weighted to reflect those industries shown in Table 1. This is because the Georgia Production Index does not include the tobacco, ordnance, instruments, or miscellaneous manufactures industries.

with it. A second factor, and the first of two which account for a relative difference between a region's growth rate and the nation's, is the "industrial mix effect." In other words, does a region have a high or low proportion of rapidly growing industries (those whose national growth rate exceeds the national all-industry growth rate)?² A third element

²For example, the U. S. paper industry grew 35.4 percent between 1967-1973. The total U. S. manufacturing growth rate was 26.4 percent (see Table 1).

These results appear in Column B. Thus, if all Georgia industries were to grow at the national average rate, the total growth in Georgia manufacturing value added would have been \$1,155.3 million (total, Column B).

The second factor in a region's growth and the first of two which account for a relative difference between its growth rate and the nation's is called **industrial mix effect**. To compute the industrial mix effect, the difference between the national all-industry growth rate (26.4 percent) and the individual national industry growth rates (Column H) is applied to the individual area industry value added (Column A). The results are in Column C. When a national individual industry growth rate is higher than the national all-industry growth rate, that industry is termed a high growth rate industry. Since the total of Column C is negative, it can be concluded that Georgia has a slightly higher proportion of slow-growing industries in its industrial mix than does the nation.

The third element in a region's industrial growth and the second which makes for a relative change between it and the nation is the **regional-share effect**. It is computed by applying the difference between individual industry growth rates of the region and the nation (Columns G and H to Column A). The results are in Column D. Column E shows the total change over the period in value added in Georgia, which is the total of Columns B, C, and D. Column F shows the relative change (i.e., changes not associated with national growth), which is the total of Columns C and D.

The results yield a national growth effect of 82 percent, an industrial mix effect of -4.9 percent, and a regional share effect of 22.9 percent. Georgia's increase in manufacturing output relative to the nation was 18 percent over the 1967 to 1973 time period.

in a region's industrial growth, and the second which makes for a relative difference between it and the nation's, is the "regional-share effect." This compares growth rates of similar regional and national industries, e.g., Georgia textiles with national textiles.

The Georgia Industrial Production Index, like its national counterpart, is based on increments to value added in manufacturing. By comparing changes in the state and national indexes from 1967 to 1973 and applying these to value added in

TABLE 1
SHIFT SHARE ANALYSIS
Georgia Industrial
Production Changes (1967-1973)
Attributable To

Industry	A	B	C	D	E	F
	Georgia Manufacturing Value Added	National Growth	Industrial Mix	Regional Share	Total Change (B + C + D)	Relative Change (C + D)
	1967					
Foods	521.9	137.8	- 19.3	43.3	161.8	24.0
Textile Mill Products	997.6	263.4	9.0	225.5	497.8	234.4
Apparel Products	389.5	102.8	- 51.4	13.6	65.1	- 37.8
Lumber and Products	123.2	32.5	1.8	- 2.5	31.9	- 0.6
Furniture and Fixtures	68.6	18.1	- 0.2	5.2	23.1	5.0
Paper and Products	413.9	109.3	37.3	- 39.7	106.8	- 2.5
Printing and Publishing	146.2	38.6	- 19.3	5.7	25.0	- 13.6
Chemicals and Products	303.0	80.0	72.1	28.5	180.6	100.6
Petroleum Products	14.7	3.9	0.1	- 8.5	- 4.5	- 8.3
Rubber and Plastic Products	68.1	18.0	25.5	111.4	154.9	136.9
Leather and Products	28.1	7.4	- 12.0	6.3	1.7	- 5.7
Clay, Glass and Stone Products	151.4	40.0	5.1	23.5	68.6	28.6
Primary Metals	66.8	17.6	0.4	48.4	66.4	48.8
Fabricated Metal Products	139.3	36.8	5.7	- 43.0	- 0.6	- 37.3
Nonelectrical Machinery	122.8	32.4	- 1.7	11.2	41.9	9.4
Electrical Machinery	113.3	29.9	0.5	192.6	222.9	193.0
Transportation Equipment	707.8	186.9	-122.5	-299.4	-235.0	-421.9
Total	4,376.2	1,155.3	- 68.9	322.0	1,408.4	253.1
% of Total Change (E)		82.0	- 4.9	22.9	100.0	18.0

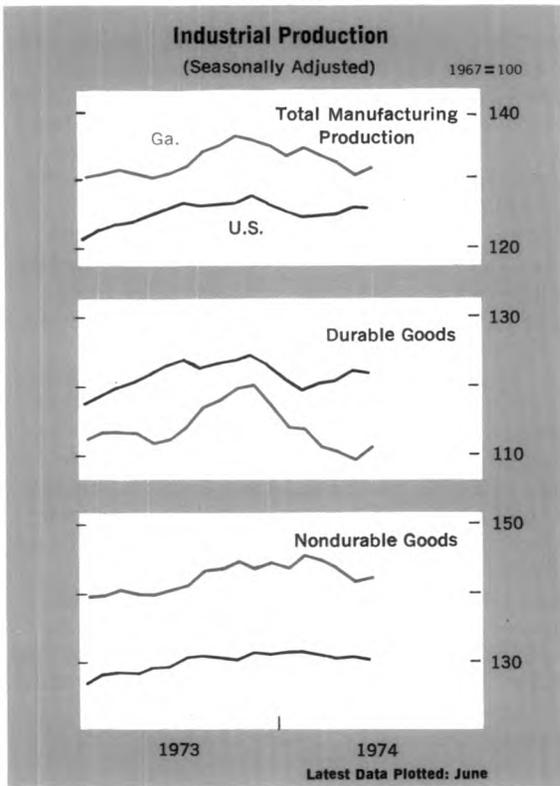
* "constant" = 1963 dollars

the base year (1967), it is possible through the shift-share technique to measure the relative strengths of the national growth, industrial mix, and regional share effects on Georgia's manufacturing growth. The results of this analysis are presented in Table 1. A more detailed explanation of the analysis is provided in the box.

The following conclusions may be inferred from this analysis. First, national industrial growth is a very important element in the state's industrial development. From 1967 to 1973, the national growth effect made up 82 percent of the change in manufacturing value added. Second, Georgia's industrial mix is slightly weighted toward relatively slow-growing industries, since the industrial mix effect tended to reduce the state's production by 4.9 percent. Third, the regional share effect accounted for a positive differential change in that Georgia's industries outperformed the nation's, although the state mix is weighted toward slower-growing industries. Thus, value added tended to increase, through the regional share effect, by 22.9 percent. The totals of Columns B, C, and D (Table 1) in dollar terms add up to the total change in Georgia's industrial production as measured by value added, i.e., \$1,408,400,000. The relative change between Georgia industrial growth and that

Industry	G	H
	1973 Industrial Production (1967 = 100)	
	Ga.	U. S.
Foods	131.0	122.7
Textile Mill Products	149.9	127.3
Apparel Products	116.7	113.2
Lumber and Products	125.9	127.9
Furniture and Fixtures	133.7	126.1
Paper and Products	125.8	135.4
Printing and Publishing	117.1	113.2
Chemicals and Products	159.6	150.2
Petroleum Products	69.6	127.4
Rubber and Plastic Products	327.3	163.8
Leather and Products	106.1	83.7
Clay, Glass and Stone Products	145.2	129.8
Primary Metals	199.5	127.0
Fabricated Metal Products	99.6	130.5
Nonelectrical Machinery	134.1	125.0
Electrical Machinery	296.8	126.8
Transportation Equipment	66.8	109.1
Index Total	132.2	126.4

CHART I



of the nation is +18 percent (Column F), a netting of industrial mix (-4.9 percent) and regional share (+22.9 percent) components. Thus, state output increased relative to the nation by \$253,100,000.

The industrial mix was a negative growth element in Georgia because of its heavily weighted, slow-growing industries such as food, apparel, printing, and transportation equipment. The regional share factor, however, was a positive element, simply because most Georgia industries grew faster than their national counterparts. Of the 17 industries listed in Table 1, 12 grew faster in the state than nationally. The combined impetus of such a broad spectrum of relatively fast-growing industries added a positive 22.9 percent to industrial growth, offsetting the negative 4.9-percent industrial-mix effect. This yielded a positive relative change (shown in Column F) of 18 percent. This balanced growth is especially beneficial since, on a regional share basis, the sharp fall in transportation equipment materially dragged down the Georgia regional share totals. Thus, while Georgia has inherent strength for sustained industrial growth, attributable to the rapidly growing nature of the region, it is also very much tied to the nation's economy.

State and National Production Compared

Recently, the national economy has slowed markedly. National industrial production has reflected this slowdown. How has Georgia's industrial sector fared? Total national manufacturing production peaked in November 1973 at a level 27.4 percent above its 1967 base; since then it has generally drifted downward (see Chart I). However, in May 1974, it was only 1.4 percent below its November peak.

State production peaked in October, one month before its national counterpart, and likewise drifted

CHART II

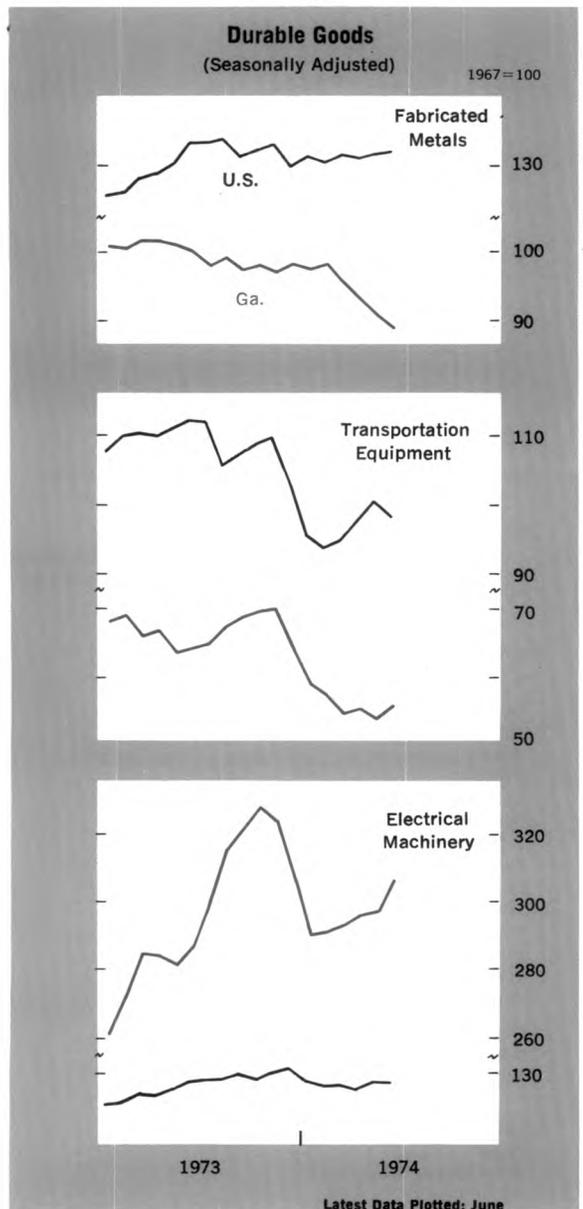
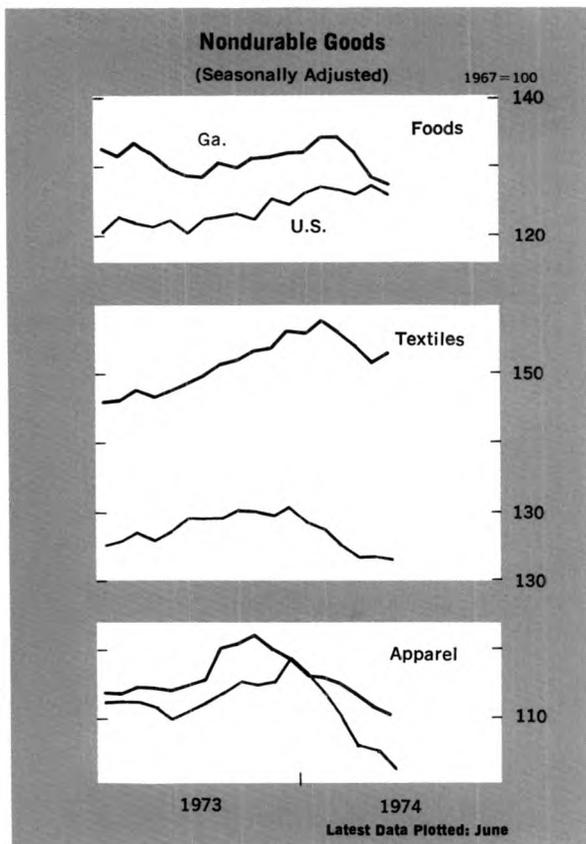


CHART III



downward through May 1974; and in June it recovered slightly. In percentage terms, however, the drop in Georgia industrial production has been over twice that of the U. S. over the same time period. Durable goods production in both the U. S. and Georgia peaked in November 1973 and then fell through February. However, U. S. durables recovered slightly from February to May; Georgia durables production continued to slide during that period. Both U. S. and Georgia nondurable goods manufacturing peaked in February of this year; the state's nondurable goods production fell more sharply through June than did that of the country as a whole.

Thus, there seem to be two major differences between this slowdown and the 1969-1970 recession. First, Georgia did not suffer as much as the nation during that recession.³ While nondurable goods production turned down in the nation, the state's nondurables sector merely slowed its rate of production increase but continued rising. During the current downturn, however, Georgia nondurables fell 2.5 percent from February to June, while U. S. nondurables fell less than 1 percent.

Second, Georgia's durable goods production has fallen more sharply than in 1970; national durables production fell at about the same rate in 1970. However, during the current slowdown, U. S.

³See "An Industrial Production Index for Georgia," this Review, May 1973.

TABLE 2
GEORGIA MANUFACTURING CHANGES
DURING CURRENT SLOWDOWN

Declining Industries	Index Value (1967 = 100)		% Change Since Peak	
	Peak Month	June 1974		
Textiles	2-74	157.6	153.9	- 2.3
Apparel	10-73	122.0	110.3	- 9.6
Chemicals	9-73	165.0	154.8	- 6.2
Foods	3-74	134.3	127.3	- 5.2
Printing	10-73	119.2	110.3	- 7.5
Lumber Products	1-74	140.2	128.7	- 8.2
Primary Metals	1-74	219.1	204.1	- 6.8
Fabricated Metals	4-73	101.8	88.9	-12.7
Electrical Machinery	10-73	327.7	306.0	- 6.6
Stone, Clay, Glass	2-74	156.2	153.1	- 2.0
Transportation Equipment	11-73	69.7	55.9	-19.8
Furniture	8-73	141.4	119.4	-15.6
Rubber Products	4-74	359.9	345.0	- 4.1
Leather Products	6-73	109.7	90.9	-17.1
Petroleum	5-73	73.3	69.2	- 5.6
Durables	11-73	119.6	110.7	- 7.4
Nondurables	2-74	145.1	141.6	- 2.4
Total Manufacturing	10-73	135.8	131.0	- 3.5
Advancing Industries	June 1973	June 1974	% Change	
Paper	124.0	133.6	+ 7.7	
Nonelectrical Machinery	134.2	146.0	+ 8.8	

durable goods production fell by only 2 percent from November 1973 to May 1974, whereas the state's durable goods production fell by 7.4 percent.

Major durable industries influencing the recent production decline are fabricated metals, electrical machinery, and transportation equipment (see Chart II). Major nondurable goods industries in the state which have contributed to the total slowdown are: foods, textiles, and apparel (see Chart III). In general, the state's production pattern for these industries follows that of the U. S., though the state's production downturn has been more severe than the nation's.

Conclusion

The shift-share analysis, comparing Georgia's industrial production to that of the U. S., indicates that the state's manufacturing is largely dependent on national manufacturing trends. While Georgia's regional share component was strong (roughly 23

percent), the stronger national growth component (82 percent) indicates the state's dependence upon national economic movements. Comparing Georgia's Industrial Production Index to the nation's in the current slowdown supports the national dependence effect suggested by the shift-share analysis.

While Georgia industry fared better than the nation during the 1969-70 recession, such a better-than-national performance should not always be expected. The current slowdown is a case in point. Recent movements in the state's unemployment rate show a similar pattern to industrial production trends, i.e., a poorer-than-national performance. In August 1973, the state's rate was 3.7 percent; the national rate was 4.7 percent. In July of this year, Georgia's rate had risen by 1.1 percentage points, almost double the national rise of 0.6 percent. Even given the state's past record of rapid economic growth relative to the nation, the national economy still calls the tune. ■