

Industrial Structure and Recession in Ohio

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The regional impact of a recession is determined largely by the industrial structure of the regional economy. National business cycles, which differ in their degree of severity, are transmitted through the region's industrial structure to the overall regional economy. A region in which the industrial structure is weighted toward more cyclically sensitive industries usually experiences more severe recessions than the nation as a whole. (In general, manufacturing industries are more cyclically sensitive than service industries; durable-goods industries, more than non-durable-goods; and producer-goods industries, more than consumer-goods.) Regional business cycles, however, are more than simply the local manifestations of cyclical changes in industries at the national level. Factors unique to each region, such as differences in costs and other aspects of competitive advantage, influence the regional pattern of a recession, contributing additional structural drag (or downward pull) to regional employment (see inset).

Ohio's economy is highly vulnerable to cyclical economic fluctuations, ranking third

(behind Michigan and Indiana) among the most cyclically sensitive state economies.¹ Roughly 37 percent of Ohio's total nonagricultural employment is concentrated in manufacturing, with the greatest job concentrations in cyclically sensitive industries—primary metals, fabricated metals, electrical equipment, nonelectrical machinery, transportation equipment, and rubber. The fact that these six industries account for 25 percent of the state's nonagricultural employment, compared with 14 percent in the nation as a whole, denotes the degree of employment specialization in Ohio. Unfortunately, these six industries seem to be

1. See Robert B. Bretzfelder, "Sensitivity of the State and Regional Income to National Business Cycles," *Survey of Current Business*, vol. 53 (1973), pp. 22-37. Ohio ranks third in terms of cyclical sensitivity to changes in personal income. Expansions and contractions were timed by using the dates of the peaks and troughs in real quarterly gross national product.

Earlier studies also ranked Ohio high among states by average cyclical volatility in employment. See George H. Borts, "Regional Cycles of Manufacturing Employment in the United States, 1914-1953," *American Statistical Association*, vol. 55 (1960), pp. 151-211; and Stanley Engerman, "Regional Aspects of Stabilization Policy," in Richard A. Musgrave, ed., *Essays in Fiscal Federalism* (Brookings Institution, 1965), pp. 7-62.

operating at a long-term competitive disadvantage, having grown more slowly over most of the post-World War II period in Ohio than in the nation as a whole.²

With unemployment (seasonally adjusted) in Ohio reaching 9.3 percent in May, compared with 7.8 percent in the nation, the current recession has already begun to have a serious impact on the state's economy.³ As a means of interpreting the present recession, this *Economic Commentary* examines the influence of the industrial structure on employment in Ohio during the recessions in 1966-67, 1969-70, and 1973-75.

Cyclical Sensitivity of Recent Recessions

In virtually every instance (except transportation equipment in the 1969-70 recession), the major manufacturing industries in Ohio have experienced more severe peak-to-trough employment contractions than the national industries in each of the last three recessions, as measured by the number of quarters of decline times the average quarterly rate of decline (see table 1). With respect to timing, the turning points for these industries in Ohio were roughly coincident with cycles in the national industries, albeit slightly fewer than half of the industry cycles at the state level coincided perfectly with the national industry cycles. State and national cycles in primary metals, for example, had identical turning points, except at the peak of the 1973-75 recession. When deviations from the timing of the national industry cycle did

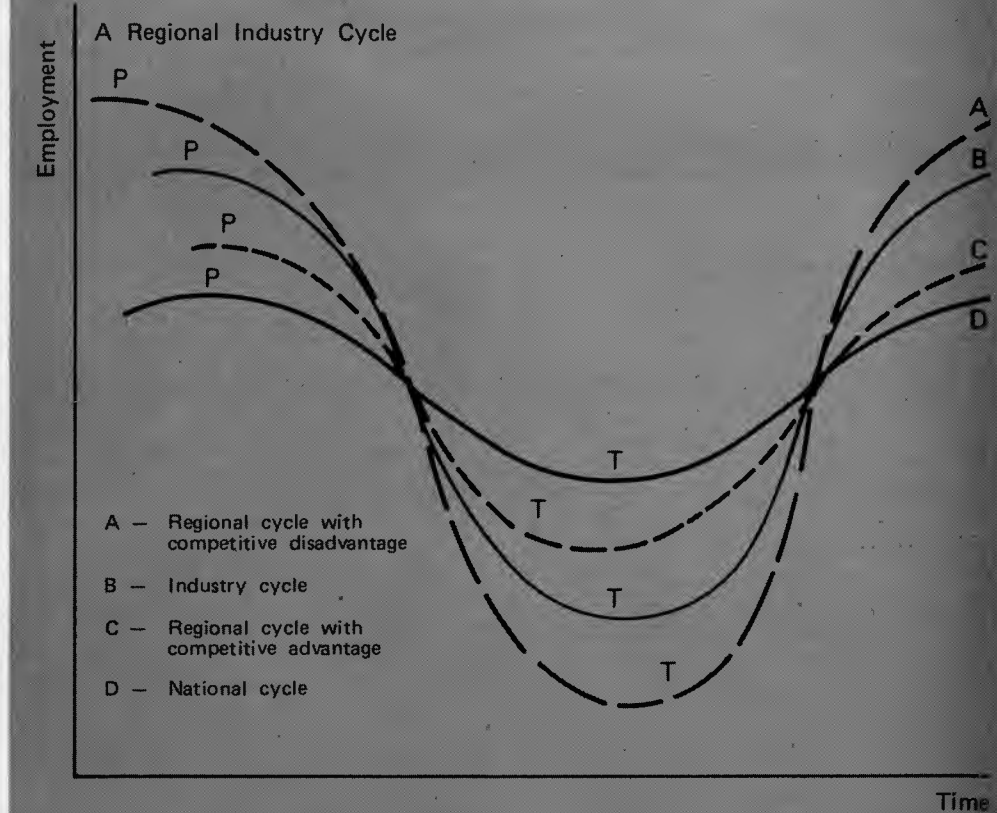
2. For evidence on the long-term growth of Ohio's industries, see Roger H. Hinderliter and Robert H. Schnorbus, "Income Growth and Industrial Change in the Fourth District," *Annual Report/Economic Review*, Federal Reserve Bank of Cleveland, 1978.

3. The unemployment rate for Ohio was adjusted by using seasonal weights developed by the Federal Reserve Bank of Cleveland.

occur, as in primary metals, there was a pronounced tendency for employment in Ohio's industries to peak prior to the national industries and to begin recovery later than the national industries.

Contractions in employment lasted longer in the state than in the nation. On average, Ohio's industries experienced contractions that were one quarter longer in duration than contractions of their national counterparts. This was true for the total manufacturing sector in Ohio and for each of the major industrial groupings, except for fabricated metals in the 1969-70 recession. Ohio's industries also tended to experience shorter and milder recovery periods. Despite contractions that were two quarters longer in both the 1966-67 and 1969-70 recessions, the recovery of Ohio's electrical equipment took one fewer quarter than the national industry to go from the trough to the next peak (1969:IIIQ) and two fewer quarters to go from the trough to the next peak (1973:IVQ). As a result, the industry cycles in the state, on average, were not necessarily longer than the industry cycles in the nation; however, the contractions in employment for the state's industry cycles tended to last longer than in national industry cycles, and the recovery tended to be shorter than in industry cycles for the nation.

To compensate for differences in turning points during the contraction phase, the relative severity of the industry cycles in Ohio can be examined by comparing their *average quarterly rate* of contraction with the industry changes at the national level. To begin with, the national cycle (represented by total employment in the nation) on average declined no more than 1 percent per quarter during the three recessions for which data exist; thus, the national cycle accounted for a relatively small portion of the total cyclical decline experienced either by the industries in Ohio or in the nation. Similarly, performance of industries nationally did not



A hypothetical employment cycle of a regional industry with above average cyclical sensitivity (such as Ohio's primary-metals industry) can be used to illustrate the interaction between industrial structure and competitive advantage. If the regional industry merely mirrors the influence of national economic activity, it would have the same cyclical pattern as the *national cycle* (D). The regional industry performs differently from the overall national economy because of the regional industry's disproportionate sensitivity to recessions. If the regional industry merely duplicates the performance of its national counterparts, it would have the same pattern as the *industry cycle* (B) in the nation. The peaks and troughs of the industry cycle, on average, would align identically with the national cycle; only the amplitude would differ. The existence of a *competitive disadvantage* (A) (for example, higher plant operating costs that cause the regional industry to underperform relative to the national industry) not only intensifies the regional severity of the industry cycle, but it also may change the timing and duration of the contraction as well as shorten the recovery. A *competitive advantage* (C) works in the opposite way and may offset some of the adverse cyclical sensitivity, delay the peak, and shorten the duration of the contraction. The overall regional business cycle, constructed by aggregating the actual employment patterns of all regional industries, would capture the national and regional behavior of the industries.

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Table 1 Cyclical Severity of Recent Recessions: Ohio vs. United States

Employment by industry	Ohio			United States		
	Peak	Duration	Severity, percent	Peak	Duration	Severity, percent
Total employment	IQ '67	1	-0.66	IIQ '66	4	+0.71
	IVQ '69	4	-0.71	IQ '70	3	-0.34
	IIIQ '74	3	-1.54	IIIQ '74	3	-0.88
Total manufacturing	IVQ '66	3	-0.99	IVQ '66	3	-0.33
	IIIQ '69	9	-1.35	IIIQ '69	8	-1.10
	IVQ '73	7	-2.04	IVQ '73	6	-1.92
Primary metals	IVQ '66	3	-2.78	IVQ '66	3	-1.92
	IVQ '69	8	-2.62	IVQ '69	8	-2.13
	IVQ '73	7	-2.64	IIIQ '74	4	-3.89
Fabricated metals	IVQ '66	4	-0.45	IVQ '66	3	+0.41
	IVQ '69	4	-3.59	IIQ '69	7	-1.76
	IVQ '73	7	-2.48	IVQ '73	7	-2.02
Electrical equipment	IVQ '66	3	-2.30	IQ '67	1	-2.62
	IIIQ '69	9	-2.24	IIIQ '69	7	-1.99
	IVQ '73	6	-3.37	IVQ '73	6	-3.00
Nonelectrical machinery	IVQ '67	3	-0.75	IQ '67	3	-0.42
	IVQ '69	8	-2.68	IQ '70	5	-2.67
	IIIQ '74	5	-2.45	IIIQ '74	4	-2.46
Transportation equipment	IVQ '66	3	-1.88	IVQ '66	3	-0.86
	IVQ '68	8	-2.91	IVQ '68	8	-3.33
	IVQ '73	7	-2.78	IVQ '73	5	-2.52
Rubber	IVQ '66	2	-3.93	IQ '67	1	-6.68
	IIQ '69	6	-1.76	IVQ '69	4	-1.50
	IIQ '73	8	-2.42	IQ '74	5	-3.29

SOURCES: U.S. Department of Labor and Federal Reserve Bank of Cleveland.

The method of analyzing employment changes in a recession follows standard procedures used to measure cyclical sensitivity. For each industry, monthly employment data were seasonally adjusted and converted to quarterly figures by a simple averaging technique. Other than the quarterly averaging, the pattern of employment was not smoothed over the cycle. Casual observation of the employment data suggests, however, that employment growth has been less rapid in Ohio than in the nation as a whole, a development that would be expected to bias the results to the state's disadvantage. Specific industry recessions were identified for Ohio and the nation by selecting turning points (peaks and troughs) in each industry's employment series. The 1969-70 and 1973-75 recessions experienced absolute employment contractions between peak and trough. The other recession for which data are available (1966-67), however, was a much milder growth-cycle phase, with only a decline in the rate of employment growth between peak and trough.

Comparisons of timing, duration, and relative severity were made for each industry in Ohio and the nation. *Timing* is the difference in regional and national industry turning points. *Duration* is the number of quarters of employment decline between peak and trough in each recession for Ohio and the nation. *Severity* is the average quarterly rate of contraction, computed by dividing the average quarterly decline of an industry's employment by the average level of employment over the cycle.

account for all of the remaining cyclical severity experienced by the Ohio industries. In the most extreme case, transportation equipment in the 1966-67 recession declined at an average quarterly rate of 0.86 percent nationally, while total employment increased at 0.71 percent. Employment in the transportation equipment sector in Ohio dropped at a 1.88 percent average quarterly decline, more than double the national industry's rate of decline.

The sheer magnitude of the difference between the state and national industry contractions strongly suggests the extent to which competitive differences have influenced employment in Ohio. In over half of the cases examined, the rate of decline for the state industry during recessions exceeded the rate of decline for the national industry, and usually by a significant margin. In the 1969-70 recession, for example, fabricated metals experienced an average quarterly rate of decline of 3.59 percent in Ohio, slightly more than double the decline in the nation. Electrical equipment declined 2.24 percent per quarter over nine quarters in Ohio, compared with 1.99 percent over seven quarters in the nation. In some industries, the severity of the contraction was hidden by the longer time period over which the entire contraction occurred, as in the case of the rubber industry. The difference in rates of decline may be attributed in part to a set of factors that have placed Ohio industries at a competitive disadvantage compared with their national counterparts. In effect, these factors appear to have created within the state a reserve of marginally productive plant capacity that is normally the first to be cut back when demand weakens at the onset of a recession and the last to be brought back into production during a recovery.

The lack of complete uniformity in the cyclical behavior of state and national industries suggests that special short-term factors may have influenced the specific cycles of Ohio's industries. Almost half of the cases

where a state industry exhibited a smaller employment decline than its national counterpart were concentrated in the rubber industry. Nonelectrical machinery accounted for two instances where state and national rates of decline were about equal. Some industries in Ohio may be less vulnerable to cyclical fluctuations due to several possible factors: a need to protect skilled workers, especially white-collar workers, in a region that has been losing population; a favorable product mix in consumer goods where demand remains strong (for example, small, fuel-efficient automobiles in the current recession); or proximity to markets, which holds down transportation costs to the buyer.

Concluding Remarks

Competitive position is one of the most important phenomena determining regional economic performance. In the last three recessions, Ohio's industrial structure contributed to contractions that were more severe than would have been expected from the national cycle, even when adjusted for the greater cyclical sensitivity of the industries under consideration. The magnitude of the current recession is being affected by changes in demand for Ohio's industrial products. Increased consumer demand for fuel-efficient automobiles has drastically reduced employment in Ohio's automobile and tire industries and has had a spillover effect on the steel industry's employment. Yet, the continuing need to retool for smaller-sized automobiles will help sustain employment in the machinery industry, compared with past recessions. However, the existence of competitive disadvantages in Ohio increases the likelihood of greater employment cutbacks during this recession, even among industries with relative strength.

The views stated herein are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System.