Rapid Growth and Construction: Ups and Downs for the Southeast

Many cities in the Southeast are experiencing either deep cyclical employment declines or sharp downturns in employment growth as a result of the current recession. Some metropolitan areas have suffered larger changes in employment between peaks and troughs than others. Why do some cities take a wilder ride on the business cycle roller coaster? What role does the construction sector play in cyclical employment changes?

Traditionally, the construction industry is one of the hardest hit during any recession. Of the major sectors in the economy, only the durable goods sector is more cyclical than construction. As Sunbelt cities enjoy rapid growth in total employment, will larger accompanying construction sectors make these cities more vulnerable to recession? High growth usually encompasses expansion in the downtown business district, in manufacturing or service facilities, and in new residences for in-migrating workers—all of which means development of a larger construction sector in both absolute terms and as a share of total employment.

Of course, financing of construction makes the construction sector very sensitive to interest rate fluctuations and, so the generally held theory goes, therefore very cyclical. Growth and construction are widely believed to produce such cyclicality in a local economy. But do faster-growing metropolitan areas actually have relatively larger construction sectors? Is the construction sector more volatile than the overall economy? In turn, are high growth areas—with supposedly larger shares of employment in construction—actually more cyclical than slow-growth cities? Finally, what are some characteristics of the construction sector that determine its cyclical behavior?

Cities which have experienced rapid population growth have also enjoyed robust construction employment growth. But many fast-growing cities in the Southeast should expect more volatility in employment during the '80s.

Table 1. The proportion of total employment engaged in construction tends to be higher in those cities with higher growth rates in total employment.

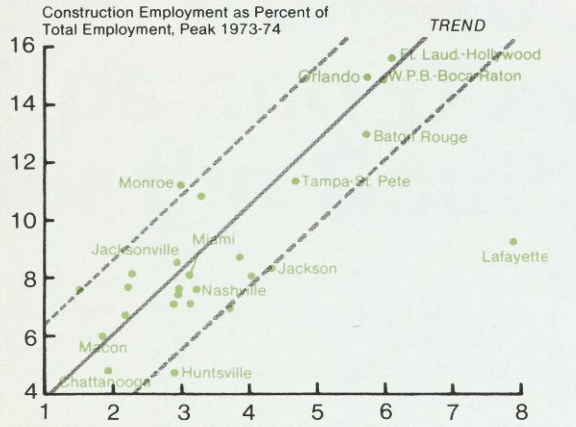
	Total Empl. (S. A.) Ave. Monthly Growth Rate (Annualized %)	Construction Employment as a Percentage of Total Employment (Data Not Seasonally Adjusted)		
	1/70-11/81	Peak During 73-74	Trough During 75-76	1/80*
Alabama				
Mobile	3.95	7.95	7.26	7.84
Montgomery	3.81	8.70	6.24	8.50
Birmingham	2.91	7.26	5.91	5.49
Huntsville	2.86	4.92	3.42	3.18
Tuscaloosa	2.26	7.69	5.30	4.40
Florida				
Ft. Laud. – Hollywood	6.12	15.46	6.46	9.02
W.P.B. – Boca Raton	5.93	14.38	6.92	10.23
Orlando	5.66	14.52	5.29	6.79
Tampa – St. Pete.	4.72	11.28	5.92	7.41
Pensacola	3.37	10.82	6.51	7.01
Miami	3.14	8.08	3.93	5.19
Jacksonville	2.91	8.52	5.37	5.37
Georgia				
Atlanta	3.76	6.91	3.98	4.70
Augusta	3.20	6.52	5.41	4.81
Savannah	2.36	8.12	6.11	6.23
Macon	1.77	6.19	4.21	4.97
Columbus	1.53	7.55	5.37	4.95
Louisiana				
Lafayette	7.89	9.09	6.71	6.83
Baton Rouge	5.72	12.94	9.87	11.52
Alexandria	3.26	7.16	5.28	7.25
New Orleans	2.94	7.43	6.06	6.22
Monroe	2.88	11.16	7.83	7.57
Mississippi				
Jackson	4.38	8.25	4.54	4.95
Tennessee				
Nashville	3.41	7.46	5.21	4.98
Knoxville	2.89	7.06	5.07	5.50
Memphis	2.24	6.71	4.17	4.38
Chattanooga	1.82	4.95	3.42	3.71
Sample Population				
Mean	3.62	8.78	5.62	6.26

*1/80 is chosen as a date representative of a "trend period" in levels of total employment. Of course, each SMSA may be closer than others to the trend value of each SMSA's employment level for this particular date. Similarly, the years 73-74 and 75-76 typically represent years that are generally considered the strongest and weakest time periods respectively for construction activity during 1/70 through 11/81.

Employment growth and the relative size of the construction sector. Why would one expect to find metropolitan areas, which are experiencing rapid growth in employment, to also have larger shares of employment in construction? The "classical" developing economy—local, regional, or national—requires larger percentage infusions of "capital" into the economy.[1] High-growth economies require greater amounts—in fact, greater

[1]See Ensey D. Domar, "Capital Expansion, Rate of Growth, and Employment," **Readings in the Modern Theory of Economic Growth**, ed., Joseph S. Stiglitz and Hirofumi Uzawa (Cambridge, Massachusetts: The MIT Press, 1969), pp. 34-44.

Chart 1. As the growth rate of total employment increases, the percentage of employment in construction tends to increase also.



rates of investment—than do slow-growth economies. In concrete terms, high-growth developing economies require the capital goods of new manufacturing plants, new office buildings, public goods such as roads and schools, and also housing. In terms of growth rates for total employment and the associated size of the construction sector, what has been the experience of the Southeast?

From 1970 through 1981, average annual growth rates for total employment in individual southeastern cities have varied considerably. Average annual growth rates have ranged from just over 1.5 percent to almost 8 percent (see Table 1, first column).[2] The rest of Table 1 shows that the proportion of total employment engaged in construction tends to be higher in those cities with higher growth rates in total employment. This relationship is further confirmed by Chart 1 which relates growth rates and the share of employment made up by construction (for the highest peak of construction shares during 1973-74). Each "plus sign" represents an individual SMSAs average growth rate for total employment (horizontal scale) and also the share of total employment in the construction sector (vertical scale). This "scatter diagram" does show that faster-growing areas have relatively larger construction sectors. The upward slope of the trend line indicates that cities lying in the upper right-hand segment of the chart have both higher growth rates and larger construction sectors than cities in the bottom left-hand section of the chart. Metropolitan areas such as Fort Lauderdale-Hollywood, Orlando, and Baton Rouge do have relatively larger construction sectors. Hence, it is probably widely recognized that growth results in—and is facilitated by—the addition of office space, new residences, new highways, and other physical signs of urban growth.

Of course, the share of employment in construction may vary between cities with the same growth rate. Growth in some sectors of the economy, such as the service sector, may require less construction than others, such as manufacturing, which requires physical plant facilities. Past developments in construction can also make a difference. One might expect that some cities may have "overbuilt" in earlier time periods (previous to January 1970 for the purpose of this study) and were already prepared for office expansion, new home buyers, and heavy increases in highway traffic as growth means relatively higher levels of construction for the "physical accommodation" of employment growth. In the Southeast, such has occurred to some degree.

The cyclical influence of the construction sector on the overall economy. Faster-growing cities have been shown to have relatively larger construction sectors than their slower-growing counterparts. One would expect construction growth to be destabilizing on the overall economy only if the construction sector is more cyclically volatile than the total local economy. Why should one expect construction to be more cyclical? And is construction, in fact, actually more volatile than the overall economy? The reason for expecting cyclical volatility in construction should be self-evident to most home buyers. Most construction is financed through borrowing and, for home buyers, the mortgage rate is the price of credit. Naturally, home buyers and businesses which would otherwise be expanding tend to put off investment in construction as interest rates rise during the "heated peaks" of economic activity in cyclical expansion. Construction is long-term

[2]Employment data—January 1970 through November 1981—were obtained from the U. S. Bureau of Labor Statistics and were subsequently seasonally adjusted. For this study, only SMSAs with data available from the U. S. Bureau of Labor Statistics going back to at least January 1970 were used. Though not always stated, all references in Table 1 and throughout this paper to "total employment" are for total **nonagricultural** employment.

Table 2. Total Employment and Construction Employment: Comparison of Cyclicality Measures

Constuction employment is considerably more cyclical than total employment.

	Cyclicality Measure For Total Empl. (S. A.) 1/70-3/81	Cyclicality Measure For Constr. Empl. (S. A.) 1/70-3/81
Alabama		
Birmingham	1.46977	4.76164
Huntsville	1.37700	1.82629
Mobile	1.19322	1.18306
Montgomery	1.69766	5.68286
Tuscaloosa	1.74736	4.76309
Florida		
Ft. Laud. – Hollywood	3.06307	12.21276
Jacksonville	1.58788	6.14492
Miami	1.71766	9.44708
Orlando	3.51709	10.60320
Pensacola	1.30133	4.32439
Tampa-St. Pete	2.34176	8.35592
W.P.B. – Boca Raton	2.21080	11.14086
Georgia		
Atlanta	1.91131	6.03740
Augusta	1.26897	3.92050
Columbus	1.15655	3.93440
Macon	0.71272	1.38600
Savannah	1.65996	4.54395
Louisiana		
Alexandria	1.46819	3.98970
Baton Rouge	0.98278	3.09804
Lafayette*	———	6.34007
Monroe	1.60978	4.45483
New Orleans	0.70429	2.51536
Mississippi		
Jackson	1.66063	7.72170
Tennessee		
Chattanooga	2.27138	4.47516
Knoxville	0.87653	3.79521
Memphis	1.85297	3.75046
Nashville	2.09061	5.92350
Sample Population		
Mean	1.67120	5.41972

*The model for deriving the cyclicality measures requires that employment for the SMSA basically follow the cyclical patterns of employment for the U.S. Since total employment for Lafayette "ignores" U.S. cyclical changes as a result of oil industry build-up, this measure of cyclicality was not available for Lafayette.

investment which usually can be deferred until the cost of the investment is most favorable. Home buyers in particular are more likely to be affected by budget limitations on financing long-term debt. Whereas businesses might, to some degree, "pass on" to customers the interest costs, home buyers cannot. Logically, SMSAs with large percentages of employment in the construction sector (which depends very much on cyclically volatile interest rates) should experience relatively large fluctuations around trend levels of employment. Various studies support the hypothesis that the construction sector is very cyclical.[3] But what is the evidence for the Southeast? According to the data in Table 2, construction employment is considerably more

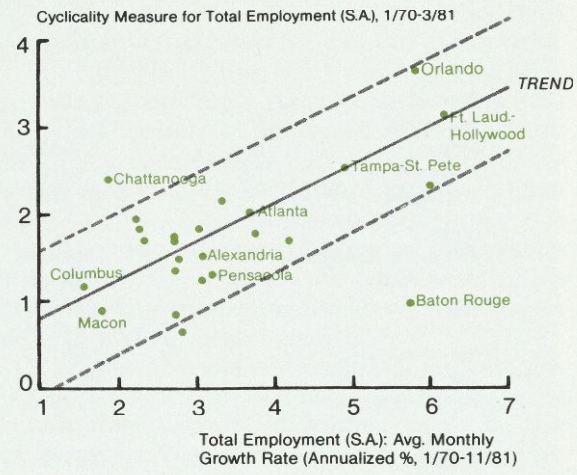
[3]Howard Friedenberg and Robert Bretzfelder, "Sensitivity of Regional and State Nonfarm Wages and Salaries to National Business Cycles, 1948-79," **Survey of Current Business**, U. S. Department of Commerce, May 1980, pp. 15-27, and also Edward Yardeni, "Is the Housing Industry Still Cyclical?" **Federal Home Loan Bank Board Journal**, February 1980, pp. 16-23.

cyclical than total employment. In this study's sample of SMSAs, only Mobile has a measure of cyclicality[4] which is smaller for construction employment than for total employment. However, this difference is not statistically significant. Higher-growth areas tend to have larger shares of employment in the construction sector. Construction employment—as expected—is more cyclically volatile than total employment.

Higher growth rates in total employment and increased cyclical volatility. As the share of employment increases in the more volatile construction sector, logically, total employment in the high growth areas should also become more cyclical. Furthermore, changes in construction employment can greatly affect local employment in other sectors. "Services-related" employment (such as in gas stations, restaurants, insurance, and retail sales) all depend partially on the income from employees in construction. Business in other sectors can decline as construction employment declines and, in turn, employment erodes further.

But the question remains: are faster-growing cities in the Southeast, in fact, more cyclical than cities experiencing slower growth in employment—and can this increased cyclicality be attributed to increased employment in construction? According to Chart 2, the cyclicality of total employment does indeed increase with the average growth rate of total employment. For comparison purposes, the plotting of the average growth for total employment versus a measure of cyclicality is very useful.[5] This scatter diagram shows that high-growth Florida cities, such as Orlando, Fort Lauderdale-Hollywood, and Tampa-St. Petersburg, also have high measures of cyclicality. Furthermore, metropolitan areas with low growth rates, such as Columbus and Macon, Georgia, and Tuscaloosa, Alabama, have low measures of cyclicality.[6]

Chart 2. The cyclical volatility of employment tends to increase with higher growth rates in total employment.



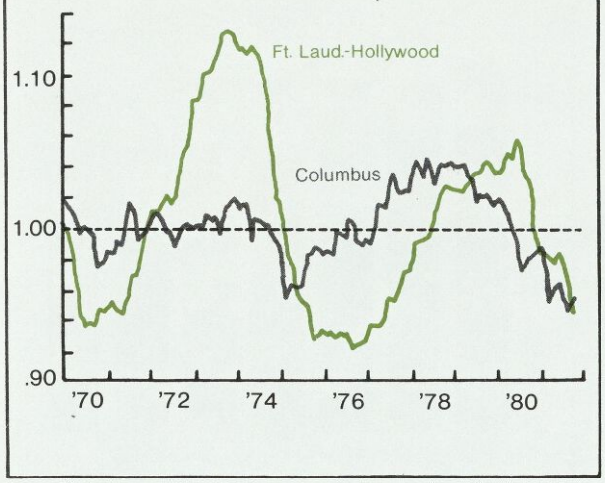
To contrast the high and low degrees of cyclical movement between these two groups of cities, Chart 3 plots detrended seasonally adjusted total employment levels for Fort Lauderdale-Hollywood and for Columbus[7]. Chart 3 indicates that Fort Lauderdale-Hollywood—a high-growth city—has relatively large cyclical changes in employment around trend levels. Actual employment since 1970 has moved in large, smooth swings above and below trend. Much of the city's employment fluctuation can be explained by extreme "starts" and "stops" in construction—Florida (including Fort Lauderdale-Hollywood) in the early 1970s experienced heavy real estate speculation which resulted in overbuilding and eventual "collapse" in 1975.

On the other hand, Columbus, Georgia is a city with employment growth falling on the low end of the scale for SMSAs in the Southeast. Industrial expansion has been slow, and only a relatively small percentage of total nonagricultural employment lies in the construction sector. Manufacturing employment and construction employment—both very cyclical sectors—are

[4]The measures of cyclicality are further discussed in the "Technical Notes."
[5]For each SMSA, cyclical movement is compared against changes in U. S. total employment. This "measure of cyclicality" increases in value as total employment becomes more cyclical—that is, "1" indicates relatively low cyclicality whereas "4" is relatively high. The measure is designed to allow for differences in the timing of peaks and troughs across the Southeast and for differences in the length of cyclical deviations from trend as well as the height and depth of cyclical movement. Furthermore, since the study is concerned with only cyclical fluctuations **around** trend; data for each SMSA have been seasonally adjusted and detrended (growth effects have been taken into account). See "Technical Notes" for further discussion on the derivation of the cyclicality measures.
[6]The reader is reminded that this study examined cyclical fluctuations **around** trend levels of employment. Cities, such as those in Florida, might not have declines in employment during recession but instead have extreme slowdowns in growth. For these high growth areas, the swings between very high growth periods and slow growth periods may be larger than relatively small shifts between slow growth and slight declines in employment for other cities.

[7]Detrended employment can be thought of as the ratio of actual employment to trend employment. Any value above "1" indicates actual employment being above trend whereas below "1" indicates actual employment being below trend. Furthermore, with detrended employment expressed in this ratio form, the percent deviation from trend is relatively easy to determine (for a detrended total employment level of 1.05 or 0.95, actual total employment is either 5 percent above or below trend, respectively).

Chart 3. Ratio of Actual Employment to Trend Employment (Columbus vs. Ft. Lauderdale-Hollywood)



not overly imposing on the local economy. Furthermore, the local military installations have had a stabilizing influence on the city's economy. Detrended employment for Columbus is definitely less cyclical; peaks are not as high and troughs are not as deep as for Fort Lauderdale-Hollywood. Also, notice that employment movements in Columbus are basically pro-cyclical to that of Fort Lauderdale-Hollywood.

Other cyclical influences on the local economy. Chart 1 and Table 1 indicate that faster-growing cities, as a rule, do have larger percentages of employment in the construction sector. Furthermore, higher-growth metropolitan areas also tend to have total employment which displays greater degrees of cyclical movement than do slower growth areas. There's a strong connection between the high degree of cyclicality and the relatively large size of the construction sector in these high-growth areas, but why can't high cyclicality be attributed completely to the high growth rates in employment which imply a large share of employment in the construction sector? Chart 2 provides a clue as to why there is not a perfect fit along the trend line comparing growth rates and measures of cyclicality.

Chattanooga, Tennessee, and Baton Rouge, Louisiana, share one trait in common-neither lies on the trend line in Chart 2. Baton Rouge lies to the "right" of the trend line—the city has high growth but employment is relatively stable along trend levels of employment. In contrast, Chattanooga lies to the "left" of the trend line in Chart 2. This SMSA has a relatively low growth rate for total employment, yet exhibits a large degree of cyclicality. According to Chart 2, Baton Rouge has consistently had larger shares of total employment in the construction sector than has Chattanooga; the share of employment in the construction sector cannot explain their differences in cyclical behavior.

However, the differences in cyclical movement can be explained by the percentages of employment in other sectors of the economy. In 1978, Chattanooga had over 55 percent of nonagricultural employment in the volatile manufacturing sector (just over 25 percent of total employment in durables) whereas Baton Rouge had only 13.2 percent in manufacturing (2.6 percent of total employment in durables). Furthermore, Baton Rouge (Louisiana's capital) has over one-fourth of its workers in the relatively stable government sector.[8]

A comparison of a more homogenous sample of cities. highly cyclical cities typically are the cities with high growth rates and large construction sectors. However, separating the effects of construction employment and manufacturing employment isn't always as easy as it was with Chattanooga and Baton Rouge.[9] To further substantiate the claim that high degrees of cyclicality are caused by larger construction sectors (as a result of high growth), a more homogeneous sample of cities needs to be examined. The best illustration would be to have several cities across the sample with varying rates of growth for total employment. for such a sample of cities, nonconstruction employment should be divided in basically the same proportions among other sectors (manufacturing, services, government, etc.) for all cities in the sample. The SMSAs in Florida provide a close—but not perfect– example of such a sample of cities. In the Southeast, the

[8]Federal Reserve Bank of Atlanta, Research Department, **Economic Characteristics of the Sixth Federal Reserve District**, November 1980.

[9]Various studies indicate that durable goods employment is even more cyclical than construction employment. Since both sectors are interest rate sensitive, changes in employment in these sectors occur somewhat simultaneously. Admittedly, separating the effects of their changes in employment on total employment is not easy. See Howard Friedenberg and Robert Bretzfelder, "Sensitivity of Regional and State Nonfarm Wages and Salaries to National Business Cycles, 1948-79," **Survey of Current Business**, U. S. Department of Commerce, May 1980, pp. 15-27, and also Edward Yardeni, "Is the Housing Industry Still Cyclical?" **Federal Home Loan Bank Board Journal**, February 1980, pp. 16-23.

Chart 4. Total Employment: Average Monthly Growth Rate on Annualized Basis, 1/78-11/81

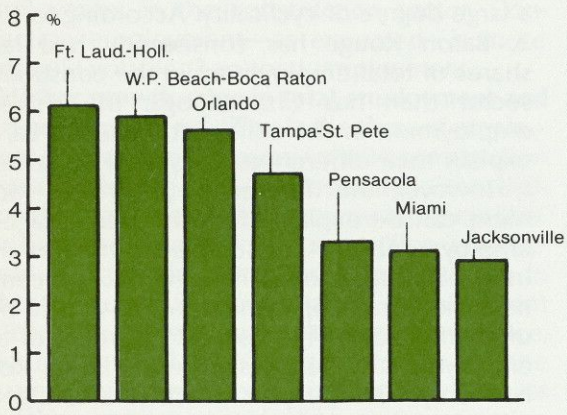
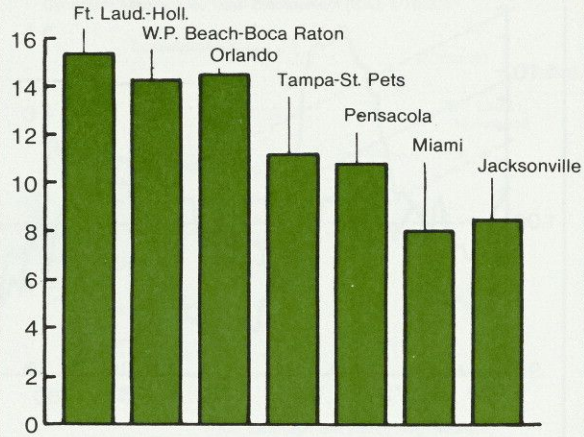


Chart 5. Construction employment as a percentage of total employment for these Florida SMSA's tends to follow the same pattern as growth rates in Chart 4.

(Highest percentage during 1973-74, not seasonally adjusted)



Florida SMSAs are about as homogeneous as can be expected. The share of employment in construction varies among these Florida cities, but the distribution of employment among other sectors is fairly similar.[10]

In Chart 4, all Florida SMSAs used for this study are shown with their respective average growth rates for total employment—highest to lowest are charted from left to right. Once again, listing the cities from left to right by growth rates, Chart 5 graphs each SMSA's share of employment in the construction sector (for peak share during 1973-74). The relative size of the construction sector share of employment corresponds almost perfectly to each SMSA's total employment growth rates. The relative size of construction employment increases with the rate of growth of total employment. As is expected, Chart 6 shows that high-growth cities—with the high share of construction employment—also have high degrees of cyclicality. For Florida SMSAs in general, as both the total employment rate and the relative size of the construction sector increase, the movement of total employment around trend levels tends to increase.

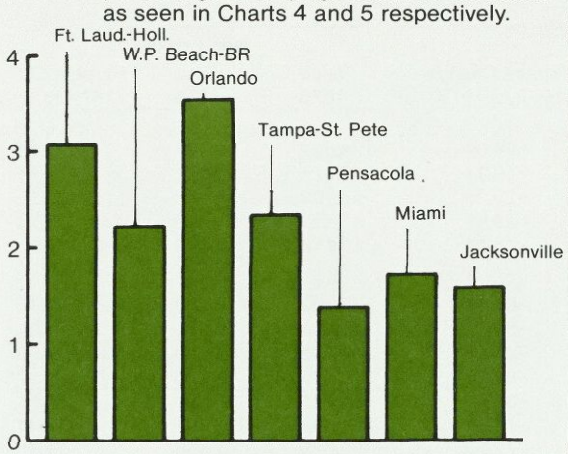
Two sets of special circumstances should be noted for Chart 6. Orlando exhibits greater cyclicality than appears warranted by the growth rate of employment and by the size of construction employment. The abnormally high measure of cyclicality is largely due to the closing of nearby military installations. Also, Pensacola is slightly less cyclical than might be expected—employment in durables is a good deal less than the average for Florida SMSAs.[11] Nonetheless, Charts 4 through 6 add considerable weight to the argument that the increased share of employment in construction is one of the major reasons that faster-growing metropolitan areas tend to be more susceptible to changes in the business cycle than their slower-growing counterparts.

Technically, larger construction sectors do not "cause" larger cyclical changes. Construction activity depends on the prior existence of the demand for other goods and services. Nonresidential construction will occur only if businesses are experiencing upsurges in demand for their "products" while residential construction depends on the demand for labor services. However, as the nation—and local economies—enters different phases of the business cycle,

[10]Federal Reserve Bank of Atlanta, Research Department, **Economic Characteristics of the Sixth Federal Reserve District**, November 1980.

[11]Ibid.

Chart 6. Though the trend is not as strong, cyclical measures of total employment (S.A., 1/70-2/81) follow the same basic pattern as the growth rate of total employment and also the percentage of employment in construction as seen in Charts 4 and 5 respectively.



the construction sector responds relatively quickly to changes in interest rates; construction purchases are "long-term" goods which typically can be deferred in the short run. (Because of the long-term nature of construction goods and because purchases usually must be financed, construction goods have relatively high short-run elasticity of demand with respect to interest rates.)

Though the construction sector doesn't "cause" changes in the business cycle, it is certainly a manifestation—as a result of interest rate sensitivity—of business cycle changes. In turn changes in construction employment have "ripple" effects on total employment in the local economy.

The cyclical influence of components of the construction sector. As discussed above, as the relatively volatile construction sector assumes a greater proportion of total employment, then, total employment in the local economy becomes more cyclical assuming all else remains the same. The increasing **share** of construction employment in total employment—as a result of expansion—is the primary reason the construction makes higher growth cities more cyclical. However, not only does the size of this sector affect changes in total employment during the business cycle but so does the degree of volatility of the construction sector. As the construction sector becomes more volatile (other things being equal), so does total employment. But this states the obvious. Just what makes construction in some SMSAs more susceptible to changes in the business cycle than in others? Does the makeup of the construction sector provide some clue for city budget officers whether or not the local economy's employment, and therefore the city's finances, remain relatively stable?

The construction sector is comprised of basically three major categories: residential, nonresidential (commercial, industrial), and nonbuilding (roads, bridges, dams). Were data for these categories available for all relevant SMSAs for peaks and troughs in a business cycle, some comparison could be made to determine which construction component plays the greatest role in making construction so cyclical and, in turn, helps indicate which cities might have the more cyclical construction sectors in the future.

In terms of construction contracts (awards), construction data are readily available from **Dodge Construction Potentials** (McGraw-Hill) for each SMSA in this study for residential and nonresidential construction. Nonbuilding construction contract data are also available (though less readily) by SMSAs. However, a limiting feature of the data is that construction on nonbuilding jobs, such as roads, cannot always be attributed to a particular SMSA since the projects do not neatly fit geographic boundaries as do residential and nonresidential projects.

Since the nonbuilding component generally creates only a small portion of total construction employment, the residential or the nonresidential components are primarily responsible for construction employment fluctuations. Therefore, to determine which metropolitan areas have more cyclical construction sectors, this study examined residential and nonresidential construction contract data from **Dodge Construction Potentials**. Table 2 shows cumulative annual values for contract awards for each SMSA for these two construction components for the 1973 peak year and for 1975, the trough year. The percentage change figures (1973 to 1975) for each category definitely indicate that residential construction is far more volatile than nonresidential construction. In Florida, the residential sector is particularly vulnerable. Only in Pensacola (for the study's sample) did the nonresidential sector

Table 3. Construction Contracts Cumulative to Date for Year (Value in Thousands of Dollars)

Residential construction is generally more volatile than nonresidential construction as is indicated by the percentage changes from the "boom" year of 1973 to the "bust" year of 1975.

	Residential			Non Residential		
	Value 1973	Value 1975	Percent Change 1973 to 1975	Value 1973	Value 1975	Percent Change 1973 to 1975
Alabama						
Birmingham	143,402	108,929	−24.04	134,821	90,147	−33.14
Huntsville	52,356	42,298	−19.21	53,422	53,422	−0.41
Mobile	78,692	55,830	−29.05	56,903	184,513	224.26
Montgomery	74,091	51,968	−29.86	41,633	54,022	29.76
Tuscaloosa	38,492	34,193	−11.17	17,118	17,815	4.07
Florida						
Fort Lauderdale-Hollywood	1,072,750	154,900	−85.56	172,002	110,562	−35.72
Jacksonville	241,968	97,385	−59.75	148,458	108,260	−27.08
Miami	726,740	213,724	−70.59	291,275	212,739	−26.96
Orlando	416,065	78,421	−81.15	216,575	60,920	−71.87
Pensacola	75,552	45,898	−39.25	65,225	33,567	−48.54
Tampa-St. Petersburg	816,648	184,133	−77.45	278,084	309,821	11.41
W.P.B.-Boca Raton	429,515	119,882	−72.09	79,793	62,656	−21.48
Georgia						
Atlanta	788,522	373,164	−52.68	555,743	281,411	−49.36
Augusta	54,273	64,737	19.28	39,933	32,259	−19.22
Columbus	29,864	45,821	53.43	37,836	36,269	−4.14
Macon	38,814	23,950	−38.30	58,539	50,744	−13.32
Savannah	30,445	34,086	11.96	17,326	24,482	41.30
Louisiana						
Alexandria	31,677	23,808	−24.84	19,920	7,579	−60.71
Baton Rouge	151,878	106,318	−30.00	142,478	116,527	−18.21
Lafayette	37,463	24,692	−34.09	15,906	14,308	−10.05
Monroe	27,731	24,361	−12.15	10,703	68,415	539.21
New Orleans	233,560	169,938	−27.24	180,255	192,590	6.84
Mississippi						
Jackson	97,970	49,908	−49.06	48,300	59,535	23.26
Tennessee						
Chattanooga	95,248	63,144	−33.71	63,099	55,144	−12.61
Knoxville	115,,443	81,148	−29.71	53,506	88,510	65.42
Memphis	340,254	120,085	−64.71	203,508	117,272	−42.37
Nashville	247,629	103,259	−58.30	213,591	144,851	−32.18

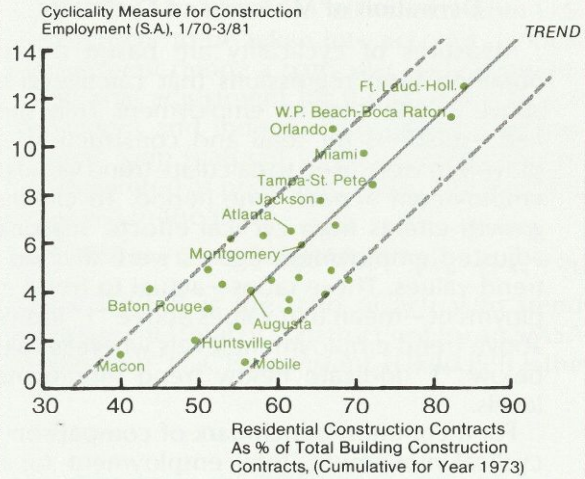
Source: **Dodge Construction Potentials**

fare worse than the residential sector during this period.[12]

[12]Part of the vulnerability of Florida's residential construction sector can be explained by the fact that the state's residential home sales depend so heavily on in-migration from elsewhere in the U. S. When potential immigrants cannot sell their homes (as a result of recession) in order to move to Florida, residential sales and eventually construction contracts suffer in Florida. See Donald L. Koch and Delores W. Steinhauser, "Florida: Dealing from Strength in Slow Year," **Economic Review**, Federal Reserve Bank of Atlanta, February 1982, pp. 14-23.

Chart 7 helps to elaborate on how the residential construction component plays a large role in determining how volatile a city's construction sector is and, in turn, total employment. As the residential component's share of building construction (residential and nonresidential combined) rises, so does the cyclicality measure for construction employment. Cities in Florida, such as Fort Lauderdale-Hollywood, West Palm Beach-Boca Raton, and Miami, show

Chart 7. Construction employment cyclical volatility tends to increase as the share of residential construction becomes larger.



highly cyclical construction employment together with high shares of construction employment in the residential component.[13] On the other hand, cities such as Macon, Huntsville, and Baton Rouge—which have relatively small shares of residential construction employment—have low measures of cyclicality for construction employment. The more cyclical nature of residential construction makes sense—businesses plan construction farther in advance than do home buyers. Businesses are usually in better financial position to continue construction plans even in the face of increased interest rates. Often, businesses can lose more by deferring expansion than by paying higher interest rates—especially since some interest cost is often passed on to consumers. In contrast, home buyers typically have more limited budgets for making monthly mortgage payments.

Summary and implications. This study has examined a large cross section of metropolitan areas in the Southeast. For the sample cities, growth rates and cyclical volatility of total employment vary considerably—with the construction sector playing a major role in affecting cyclicality. As expected, cities experiencing rapid growth also have large shares of employment in the construction sector. Also not surprisingly, the construction sector in these cities is more cyclical—due to interest-rate elasticity—than the overall economy. Higher growth rate areas, in effect, maintain higher percentages of employment in a more cyclical sector of the economy. As a result, metropolitan areas experiencing rapid employment growth are more cyclically volatile. The cyclical susceptibility of many cities is further aggravated by the rapid growth of residential construction. These are the results of this study; what are the implications in the Southeast for the future?

Many metropolitan areas in the Southeast—as part of the Sunbelt—are slated for above-average growth during the 1980s. The region's economic growth should be accompanied by employment growth greater than the U. S. average—and large construction sectors will be a significant part of this growth.

The Southeast's experience indicates that future growth promises to bring potential problems as well as blessings. Many fast-growing cities should expect wide fluctuations in employment over the business cycle. Such fast-growing states as Florida and Louisiana can expect the business cycle and swings in interest rates to have a significant impact on construction activity, construction employment, and eventually on the overall local economy. Louisiana's oil-fueled industry, for instance, could cool as excess world oil supplies continue to lower gasoline prices. Repercussions in the construction sector might have large multiplier effects on employment in many Louisiana cities. Layoffs in construction would affect business throughout the local economies—in retail sales, government, and the service sectors.

In Florida, real estate booms are inevitable as in-migration continues during prosperous economic times. Real estate values get additional support from foreign investment. But periods of high interest rates or other depressing factors can bring abrupt declines as well. Florida has experienced dizzying changes in the past. From November 1970 through November 1973, for instance, total employment for Fort Lauderdale-Hollywood increased at an average annual rate of 28.3 percent; but from November 1973 through April 1976, the SMSA's total employment fell at an annual rate of 24.4 percent.

[13]See "Technical Notes" for further elaboration on actual figures for the "cyclicality measures for construction employment" (figures appear in Table 2) and for the methodology used.

City planners and finance officials must learn that the phenomenal growth in employment and revenues they enjoy during cyclical expansion cannot continue without interruption. In particular, areas which are expanding with very large residential construction sectors should be wary. High-growth areas may not even have noticeable drops in employment. Yet, the percentage difference between trend employment and actual employment during recession is usually larger for higher-growth areas than for those with slower growth.

Business people, as well as government officials, must be prepared for the "downside" of the business cycle. In the private sector, business inventories rise as business is merely good rather than brisk as anticipated.

Therefore, governments and businesses in high-growth areas which "count on" continued expansionary growth rates in employment (and the ensuing revenues) may find that recession brings revenues that are substantially less than "expected." Southeastern government and business leaders must be aware of the probability that superheated growth during expansion will be accompanied by a cooling slowdown during recession. And that cooling, if unexpected, can force budget cutbacks for governments and businesses alike.

Technical Notes

Derivation of Growth Rates. Both the growth rates for total employment and the growth rate for construction employment were calculated using regression techniques. Monthly employment data for each category (seasonally adjusted) are regressed using an exponential growth model: $E_t = b_1 T_t + C + e_t$, where E_t is the employment level (for either total employment or construction employment) at time "t" (employment is in logarithmic form for the exponental growth model), T_t is a variable denoting different monthly time periods (i.e. 1, 2, 3 . . . 145), C is a constant term to pinpoint beginning levels of trend employment, e_t is a term for the error between actual and trend employment in time "t", and b_1 is the coefficient for the average monthly growth rate.[14] The growth rate figures in Table 1 have been "annualized" from actual regression results (monthly growth rates were multiplied by 12 to get a yearly growth rate).

Derivation of Measures of Cyclicality.

Measures of cyclicality are based on data obtained from regressions that calculated the above growth rates for employment. Fully specified equations for total and construction employment were used to calculate trend values for employment in each time period. To eliminate growth effects from cyclical effects, seasonally adjusted employment figures were divided by trend values. These ratios—actual to trend employment—mean that values above "1" indicate above trend employment levels whereas values below "1" indicate below trend employment levels.

For a common benchmark of comparison for cyclical movement, total employment for the United States was chosen. As were data for all SMSAs, total U. S. employment was detrended by dividing the actual employment figures by trend values. At this point, the data have been adjusted so as to eliminate seasonal and growth influences; only cyclical movements remain (and occasional random influences).

Other problems for measuring cyclicality remain—various SMSAs have slightly different timing of cyclical peaks and troughs than the U.S. In order to take this timing problem into account, the dependent variable (the ratio of U. S. total employment to trend employment) is lagged. Furthermore, the strength of the effects of changes in U.S. employment may vary over different time periods during different points in various cyclical phases; some SMSAs may have "long and deep" cyclical changes relative to the U. S. while others may have "short and shallow" cyclical changes. In order to measure the effects across an entire cyclical phase, the dependent variable is set up as a polynomially distributed lag (a third degree polynomial) using an Almon distribution.[15] Recognizing that some cities may be procyclical to U. S. movements, the dependent variable is "led"—in addition to being "lagged"—by nine months. In effect, the U. S. employment variable is "led" by nine months and then "lagged"—from nine months

[14]For further elaboration of exponential growth models, see Alpha C. Chiang, **Fundamental Methods of Mathematical Economics**, Second Edition, (New York: McGraw-Hill Book Company, 1974), pp. 280-321.

[15]See Shirley Almon, "The Distributed Lag Between Capital Appropriations and Expenditures," **Econometrica** 33, January 1965): 178-196.

in the future—by 24 months. This is why the cyclical measures in Table 1 cover a smaller time span than the growth rates. The lag length of 24 months is chosen because some SMSAs require a full two-year period for "all" effects from U.S. employment to be taken into account on local employment during a particular cyclical phase.

The final adjustment for the model is to put dependent and independent variables in logarithmic form (natural) so that coefficients can be interpreted as point elasticities. The model is regressed in the form:

$$\ln (E^a/E^{tr})\, t = C + B \cdot \ln (US^a/US^{tr})_{t+9-t-14} + e_t,$$

where (E^a/E^{tr}) is the ratio of actual to trend employment (total or construction) for an SMSA form in time" t", C is a constant, (US^a/US^{tr}) is the ratio of actual to trend total employment for the U.S. In an Almon distributed lag beginning nine months before time "t" and ending 14 months past time "t," B is the sum of the coefficients of the Almon distributed lag, and et is a random error term. This Almon lag is distributed as a third degree polynomial. The ratios of actual to trend employment are expressed in natural logarithmic form for dependent and independent variables. The measure of cyclicality is the sum of all positive coefficients from the Almon distributed lag—all coefficients in a "current phase."

All regressions were run using ordinary least squares—the Cochrane-Orcutt procedure presented multicollinearity problems between serially correlated errors and purposefully unexplained cyclical movements around time trends.

—**R. Mark Rogers**

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