The Effects of Supplemental Income and Labor Productivity on Metropolitan Labor Cost Differentials

by Thomas F. Luce

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The author would like to thank Anita A. Summers and Michael F. Fogarty for their helpful comments on preliminary drafts.

Introduction

Regional variations in labor costs attract a great deal of attention because of their potential to affect the regional distribution of economic activity. Because of the major role that labor costs play in total production costs, regional differences in labor costs may translate into dramatic regional differences in profitability. Profitability, in turn, is a major determinant of whether or not existing firms will expand and of whether or not new firms are likely to locate in a given region.

Most studies of regional variations in labor costs are based solely on data for payroll per employee or wages. However, the measure of labor costs that is most relevant to the profitability of a firm is the total cost of the labor needed to produce its output. There are at least two steps involved in getting from simple wage data to estimates of labor costs per unit of output.

First, nonwage income to workers ("supplemental income") must be added to wages to get total labor costs per hour. In 1977, the value of measurable supplemental income paid to manufacturing workers was, on average, about 20 percent of the value of wages paid to those workers. This percentage showed considerable variation, however, among regions and states. (See Garofalo and Fogarty [1984].) By 1982, supplemental income had increased to nearly 25 percent of wages.

Second, labor costs per hour must be scaled by the amount of output per hour that is attributable to labor inputs, as opposed to other inputs, if the objective is to measure labor costs per unit of output. The amount of output generated by a unit of labor input varies for different workers and for different production processes. Labor productivity will be different among workers possessing different skills or other personal characteristics. Similarly, productivity will vary for a single worker according to the amount of other factors of production (machinery, energy, or raw materials) used in a particular production process.

The research described here has been directed toward incorporating these two corrections to the raw wage rates to obtain a more accurate measure of labor costs per unit of output. The supplemental income estimates are a direct extension of work done at the state level by Garofalo and Fogarty.

The strategy employed to control for labor productivity differs significantly from that used in most other studies. Researchers interested in analyzing regional labor productivity patterns face hard decisions regarding the techniques and data available to them. One option is to use indirect indicators of productivity that can be measured reliably, but which may or may not be reliable proxies for labor productivity. This option uses the personal characteristics of workers to measure productivity. The strength of the technique is that it uses data that are relatively accessible and reliable. It has two major weaknesses. (1) Strong assumptions are required about the relationship between the indirect measures (personal characteristics) and labor productivity. (2) The method does not control for differences across industries or regions in capital intensity.

The other choice—the one used in this analysis—is to attempt to estimate labor productivity directly from data that measure output and input levels. The strength of this approach is that the effects of differences in the quality of labor *and* of differences in the mix of inputs (capital intensity) are both captured by the measure. This approach also has two major weaknesses: (1) Reliable data are not easily available at the regional level for some of the measures, especially capital inputs. Some variables must, therefore, be estimated (with some error) from the data that are available. (2) The option requires one to make fairly strong assumptions about the nature of production processes across industries and regions.

Neither approach is entirely satisfactory since each requires strong assumptions. It could be argued that the first approach (based on characteristics of the labor force) provides the more relevant measure for new firms seeking a location, because these kinds of firms are not tied to an existing technology or physical plant. On the other hand, the second approach, because it controls for the effects on labor productivity of existing capital intensities, may be the better measure for capturing the potential of existing firms to expand in their current location.

Indexes for wage rates, supplemental income, and labor productivity have been generated for each of the 20 commonly reported Manufacturing subsectors (two-digit SIC industries) in the 20 largest (based on 1980 employment) Standard Metropolitan Statistical Areas (SMSAs).

I. Wages

The wage data collected for this research support the finding by other researchers that wage rates vary significantly among metropolitan areas and regions in the United States. The first column of *table* I shows 1982 Manufacturing wage indexes for the 20 largest SMSAs. The indexes represent production worker hourly wages in the SMSA as a percent of the national average. In order to control for the fact that different SMSAs have different industrial structures, each SMSA's index compares the cost of that SMSA's employment mix computed from the SMSA's wage structure to the cost of the same mix at national average wages. This means that an artificially high index number will not be produced simply because an SMSA has greater-than-average concentrations of employment in industries that have wages that are higher than the average for Manufacturing as a whole.

The first thing that is clear from the wage indexes is that, in 1982, there was a great deal of variation in Manufacturing wages among these large SMSAs. Wages in the lowest-wage SMSA (Nassau) were only 75 percent of those in the highest-wage SMSA (Pittsburgh). Eight of the SMSAs showed wages less than the national average, but the weighted average wage for the 20 was 2 percent greater than the national average.

The most striking feature of the regional averages is that all of the SMSAs in the North Central region showed Manufacturing wages in 1982 that exceeded the national average. Wages in Cleveland approximately matched the regional average at about 8 percent above the national average and were greater than in all but six of the 20 largest SMSAs. Wages in the Northeast, South, and West were close to the national average, but the indexes are far from being uniformly distributed within these regions. The Northeast, for instance, shows the lowest regional average despite the fact that it contains the highest-wage SMSA in the sample (Pittsburgh). Similarly, wages in the South and West range from a low of 91 percent of the average (Dallas) to a maximum of 115 percent (San Francisco).

These regional patterns, particularly the finding that the Northeastern SMSAs showed lower wages on average than those in the South and West, are somewhat surprising. In light of the often-cited difference between wages in the "Sunbelt" and the "Frostbelt," one might have expected greater regional differences than those revealed by the data. One possible explanation for the patterns is that wages have converged over time as the result of equilibrating forces at work in the national economy. In regions where Manufacturing employment is in decline, one would expect downward pressure on relative wages. Examination of column (7) of *table* I provides some support for this view. Wages in the slower-growing Northeast and North Central regions have indeed declined relative to those in the South and West. However, the decline was significantly greater in the Northeast than the North Central and there are some clear exceptions at the SMSA level—for example, relative wages in Pittsburgh increased between 1777 and 1982 despite significant declines in Manufacturing employment during the period.

II. Supplemental Income

Estimates of supplemental income for the 20 largest SMSAs showed even more variation than the wage indexes, ranging from about 75 percent of the national average to more than 130 percent of the average. The supplemental income data available in the *Census of Manufactures* include both mandatory supplements to wages like social security and worker's compensation, and voluntary supplements like health and life insurance. Other, less easily measured fringe benefits, such as free parking or subsidized cafeterias, are not included.

Unfortunately, the regional data are reported at the state level only, with no detail

across industries. Industry detail is available only in the national data. Estimates of supplemental income for each of the 20 Manufacturing sectors in the SMSAs have been generated by combining wage data from the SMSAs with the information about regional variations in fringe benefits rates contained in the state level data and with the information about variations among industrial sectors contained in the more detailed national data. The procedure assumes supplementary income in a given industry and SMSA to be the product of (1) the level of wages in that industry and SMSA, (2) the average supplemental income rate (supplemental income divided by wages) for the industry in the nation, and (3) the average supplemental income rate in total Manufacturing in the SMSA's home state (controlling for the Manufacturing employment mix in the state). The supplemental income estimates for each industry in an SMSA are then combined in the same way as the wage estimates to get the mix-controlled index for total Manufacturing in the SMSA.

The supplemental income indexes in *table* I, column (2), compare the supplemental income cost of the SMSA's employment mix to the cost of the same mix at the national average supplemental income rates. The estimates for 1982 show the differences among the SMSAs' fringe benefits rates to be much more substantial than for wages. The supplemental income rate in

Manufacturing Wage, Supplemental Income and Labor Productivity Indexes: 20 Largest SMSAs, 1982

United States = 100

	(1) Simple wage index	(2) Supplemental income index	(3) Total labor cost index	(4) Labor productivity index	(5) Corrected labor cost index	(6) Column (5) minus column (1)	(7) Column (1) change from 1977	(8) Column (5) change from 1977
Twenty largest SMSAs[a]	102.2	98.1	101.5	99.1	102.4	0.2	-0.8	-0.7
Northeast[a]	98.6	93.3	97.7	98.7	99.0	0.4	-2.6	-3.2
Boston	96.5	85.4	94.5	104.3	90.5	-6.0	-0.8	-3.3
Nassau	89.1	74.1	86.4	95.2	90.7	1.6	-2.2	-5.5
Newark	96.5	85.4	94.4	94.6	99.9	3.4	-2.0	-1.8
New York	95.5	83.8	93.5	105.0	89.1	-6.4	-3.6	-5.9
Philadelphia	101.6	110.2	103.3	98.0	105.4	3.8	-2.8	-4.9
Pittsburgh	118.9	131.4	121.6	85.3	142.4	23.5	5.5	20.6
North Central[a]	108.0	109.9	108.5	95.9	113.0	5.0	-0.9	3.4
Chicago	103.2	106.5	103.9	94.8	109.5	6.3	-0.1	7.4
Cleveland	107.7	114.9	109.2	94.1	116.0	8.3	-1.7	2.2
Detroit	118.4	129.0	120.6	92.0	131.1	12.7	-1.3	5.3
Minneapolis	109.0	93.2	106.1	103.4	102.6	-6.4	3.9	1.8
St. Louis	104.8	97.2	103.2	104.8	98.5	-6.3	0.1	-0.4
South[a]	100.4	87.8	98.0	101.6	96.4	-4.0	1.7	-0.1
Atlanta	93.8	77.9	90.7	102.6	88.4	-5.4	-2.4	0.2
Baltimore	111.3	119.2	112.9	99.3	113.7	2.4	4.5	0.7
Dallas	91.3	74.3	88.0	103.9	84.7	-6.6	1.0	-3.2
Houston	109.1	88.8	105.1	100.1	105.0	-4.1	4.9	6.6
Washington, DC[b]	101.4	137.5	107.6	99.2	108.5	7.1	-4.5	-4.0
West[a]	101.1	96.7	100.3	102.5	97.9	-3.2	2.5	0.2
Anaheim	99.1	94.8	98.3	98.4	99.9	0.8	4.0	4.2
Denver	105.7	92.0	103.1	101.0	102.1	-3.6	4.8	2.2
Los Angeles	98.3	95.0	97.7	103.9	94.0	-4.3	2.4	-1.2
San Francisco	114.8	111.0	114.1	101.7	112.2	-2.6	1.5	2.5

SOURCE: Computed from *Census of Manufactures,* 1977 and 1982, Bureau of the Census, U.S. Department of Commerce.

a. Aggregate indexes are weighted averages of the SMSA estimates with weights based on manufacturing employment in the 20 largest SMSAs.

b. Supplemental income index for Washington, DC based on 1977 supplemental income data.

TABLE 1

Nassau (the SMSA showing the lowest index number) was only 54 percent of that in Washington, DC (the SMSA with the highest rate).

The overall pattern of supplemental labor costs reflects the wage pattern. Higher-than-average wage rates tend to be associated with higher-than-average supplemental income rates. Eight of the 12 SMSAs with higher-than-average wages had higher-than-average supplemental income rates. Similarly, all eight of the lower-than-average wage SMSAs also showed lower-than-average supplemental income. Cleveland's standing in supplemental income rates mirrored its position in wages—only three of the 20 SMSAs showed supplemental income rates higher than Cleveland's.

Total labor costs in a specific industry and SMSA are calculated as the sum of wages and supplemental income. The industry-specific estimates are then combined in the same way as the wage and supplemental income measures to get a mix-corrected estimate of the labor-cost index for total Manufacturing. Because of the rough correspondence between the wage indexes and the supplemental income indexes, and because supplemental income represents a much lower percentage of total compensation than wages, the total labor-cost indexes (column [3]) do not differ dramatically from the wage indexes. In only four of the 20 SMSAs is the difference greater than three percentage points (Atlanta, Dallas, Houston, and Washington, DC). In general, adding supplemental income to the labor-cost indexes increases the spread among the SMSAs, but not by a substantial amount.

III. Labor Productivity

Factoring labor productivity into the labor-cost estimates is also very important. If higher-than-average wages in an SMSA reflect higher-than-average labor productivity, then the index for the SMSA from column (3) of *table 1* will overstate any relative disadvantage that the SMSA might have in competing with other regions for jobs.

The potential for labor productivity to significantly alter the competitive position of an SMSA is greater than it is for supplemental income. Supplemental income represented only about 24 percent of total compensation in 1982. Any adjustment made for labor productivity, however, affects 100 percent of total compensation. Consequently, equivalent percentage differences in the two factors in an SMSA will have different effects on the overall measure of labor costs in the SMSA, with the productivity adjustment being the greater of the two.

Differences among SMSAs in labor productivity can arise from two different sources. First, differences in labor quality due to skill levels, education, or experience are likely to be reflected in differences in productivity. Many analysts, therefore, use various labor-force characteristics as proxy measures for productivity. However, there is another important source of productivity differences. The amounts of other factors of production that are used in combination with labor will affect labor productivity independently of the quality of labor. The productivity of otherwise identical workers will be different depending on the amount of capital (such as machinery and equipment) used in combination with them in the production process.

Ideally, controlling for labor productivity differences arising from both sources would require that the researcher have industry- and SMSA-specific data for output, capital inputs, labor inputs, and all other inputs. In addition, knowledge about the production process, itself—how capital and labor are combined at different levels of output—is required. With this kind of data, it would be possible to separate the portion of output directly attributable to labor from the part attributable to the other inputs.

These kinds of data are not readily available, particularly at the SMSA level. However, the *Census of Manufactures* reports value-added data by industry and SMSA. From these data, it is possible to estimate the amount of output that is directly attributable to a unit (one hour) of labor input, after controlling for the amount of capital used in the production process. The labor cost per unit of output can then be estimated by dividing the cost per unit of labor input by output per unit of labor input.

The procedure used in this research to make this calculation involved two steps. First, capital inputs were estimated by subtracting total labor costs (including the costs for nonproduction workers) from value added and dividing this difference by an estimate of the rate of return to capital. Second, the value of output attributable to a unit of labor input was estimated by assuming that capital and labor are combined in a specific way in the production process.[1] The

1 In theory, value added represents only the contribution to the total value of output that is made at the stage of production in question. Any contributions to value that are made at prior stages in the total production process (such as by the refining of raw materials, or pre-assembly of components) are not included in the "value added" at the stage of production under analysis. In reality, the value-added data reported by the Bureau of the Census includes some value that cannot be directly attributed to the labor or capital brought to bear at the stage of production in question. The capital estimates used here thus overstate capital stock. How this overstatement affects the relative measures used in this analysis depends on the extent to which the magnitude of noise in the data varies from SMSA to SMSA, a piece of information which is not available. The production process assumed for the analysis is a constant returns-to-scale Cobb-Douglas production function with a capital exponent of 0.282 (taken from Hulten and Schwab [1984]).

result is a measure of how effectively the SMSA's labor force is combined with the existing capital plant. By estimating productivity directly from output data (albeit with some strong assumptions), it is not necessary to make any assumptions about how labor force characteristics, such as education or age, affect productivity. If an SMSA's labor force possesses productivity-enhancing characteristics, the impact should be captured in the estimate of output that is directly attributable to labor inputs.

Labor productivity estimates derived by using this procedure show much less variation across the 20 largest SMSAs than either the wage or supplemental income indexes Column (4) of *table 1* reports the labor productivity indexes for the 20 SMSAs. The index represents labor productivity in Manufacturing in the SMSA as a percentage of national average labor productivity in Manufacturing. Productivity in the lowest-productivity SMSA (Pittsburgh) is about 85 percent of the national average and about 81 percent of the value for the highest-productivity SMSA in the group (New York).[2]

A primary reason for investigating labor productivity is to test whether higher-than-average labor costs in an SMSA reflect higher-than-average labor productivity. Comparisons of the third and fourth columns of *table* I suggest that this is not the case in the 20 largest SMSAs. Indeed, the simple correlation coefficient—a measure of how closely two variables move together—between the labor productivity indexes and the wage indexes is negative, indicating that, in these SMSAs, higher-than-average wage indexes are associated with lower-than-average labor productivity.[3]

The result of this negative relationship is that, when labor productivity is factored into the labor-cost indexes, the spread among the SMSAs increases Column (5) shows the labor cost per unit of output indexes. The lowest-cost SMSA (Dallas) showed labor costs in 1982 that were just uncier 60 percent of those in the highest-cost SMSA (Pittsburgh).

2 The very low index for Pitlsburgh is largely due lo lhe index for the SMSA's dominant sector — Primary Metals. Reported value added in this sector for 1982 was less than total labor costs for the seclor, a relationship which is conceptually troublesome and which is inconsistent with the labor productivity calculation. The difference between reported value of shipmenls and cost of materials was therefore substituted for reported value added in the productivity eslimation procedure. Consequently, the productivity measure for Pittsburgh should be viewed with caution, since it is likely that the problems resulting from the use of available value-added data (see fn. **1**) are particularly acute in Pittsburgh's case.

3 The correlation coefficient is 0.52

IV. Combined Effects of Supplemental Income and Labor Productivity

The supplemental income and labor productivity adjustments to the simple wage index tend to operate in the same direction. This was true for 17 of the 20 largest SMSAs. In each of the seven SMSAs where the supplemental income adjustment increased the labor-cost index, the productivity adjustment also increased it. Similarly, in 10 of the 13 SMSAs where the supplemental income correction decreased the labor-cost index, the productivity correction also resulted in a decrease.

The net change in the labor-cost measure resulting from the two adjustments is shown in column (6) of *table* **I.** In 11 of the 20 SMSAs, the net effect of the two adjustments was to decrease the labor-cost index. In these SMSAs, the simple wage index overstates relative labor costs. In the other nine SMSAs (including Cleveland), the simple index understates costs relative to the national average. The magnitude of the under- or overstatement varied substantially from SMSA to SMSA, with the understatement being the greatest for Pittsburgh, and the overstatement being the greatest for Dallas.

Overall, these results suggest that simple wage measurements will tend to distort regional labor-cost differentials. On average, the wage indexes understate relative labor costs in the higher-cost, North Central SMSAs, and overstate them in the lower-cost SMSAs in the South and West.

In addition, the productivity correction has a very significant effect on the measured change in labor costs between 1977 and 1982. The increases in costs in the South and West reflected in the simple wage indexes are largely offset by improving relative labor productivity during the period (column [8], *table 1*). On the other hand, the decline in relative wages in the North Central region is overwhelmed by the decline in the relative productivity measure. Only in the Northeast does the productivity correction have little effect on the measured change in labor costs. The net effect is that the competitive position (as measured by the productivity-corrected labor-cost indexes) of the Northeastern SMSAs improved on average between 1977 ancl 1982, while the North Central's position deteriorated, and those of the South and West remained unchanged.

What are the implications of labor-cost differentials of the magnitude found in *table 1*? Statistical analysis, relating employment growth between 1977 and 1982 to relative labor costs in 1977 in the 20 largest SMSAs, suggests that they have been significant in the past. (See Summers ancl Luce [1985].)

The finding was that, after controlling for the effects of national employment trends, unionization rates, right-to-work legisla-

tion, energy costs, vulnerability to international competition, state and local taxes, cost of living, and local amenities, a labor-cost differential of 50 percent in 1977, like the one that existed between Dallas and Detroit, was associated with a subsequent employment growth differential of almost 3 percent per year. The actual differential for these two SMSAs for the period from 1977 to 1982 was about 10 percent per year, implying that the labor-cost differential explained almost 30 percent of the total difference in growth rates.

case. Manufacturing employment declined much more quickly in these six SMSAs between 1977 and 1982 than in the other 14, or in the nation as a whole. In the six, total Manufacturing employment declined by more than 5 percent per year over this time period, compared to a decline of less than 1 percent per year in the other 14.

V. Relative Labor Costs in Cleveland

In Manufacturing as a whole, Cleveland fell into

Manufacturing Wage, Supplemental Income and Labor Productivity Indexes: Cleveland SMSA, 1982

United States = 100

	(1) Simple wage index	(2) Supplemental income index	(3) Total labor cost index	(4) Labor productivity index	(5) Corrected labor cost index	(6) Column (5) minus column (1)	(7) Column (5) change from 1977
Total manufacturing[a]	107.7	114.9	109.2	94.1	116.0	8.3	2.2
Durables[a]	109.0	116.5	110.6	94.6	116.9	7.9	2.4
Lumber products	108.2	115.5	109.4	102.3	107.0	-1.2	-2.7
Furniture and fixtures	110.8	118.3	112.0	107.8	103.9	-6.9	-20.1
Stone, clay and glass	100.2	106.9	101.5	97.3	104.3	4.1	-0.5
Primary metals	111.3	118.7	113.2	93.0	121.7	10.4	23.5
Fabricated metals	111.7	119.2	113.2	95.2	118.9	7.2	2.8
Non-elec. machinery	106.2	113.3	107.5	86.9	123.8	17.6	11.9
Elec. machinery	117.0	124.9	118.5	114.9	103.1	-13.9	-2.1
Trans. equipment	105.6	112.7	107.2	98.4	109.0	3.4	-29.3
Instruments	94.5	100.8	95.5	90.5	105.6	11.1	-2.8
Other durables	99.4	106.0	100.5	87.0	115.5	16.1	-4.1
Nondurables[a]	102.7	107.5	103.5	92.7	111.7	9.0	1.8
Food and kindred	102.0	108.9	103.3	93.7	110.3	8.3	-22.1
Textiles	85.1	90.8	86.0	112.0	76.8	-8.3	-6.0
Apparel	161.6	172.4	163.1	125.8	129.7	-31.9	13.5
Paper and allied	89.1	95.1	90.2	81.1	111.3	22.2	14.9
Printing and publishing	110.3	117.7	111.4	87.1	128.0	17.7	11.9
Chemicals	95.7	102.1	97.0	92.5	104.9	9.2	2.1
Petroleum products	74.2	79.2	75.2	94.0	80.0	5.8	-18.7
Rubber and plastics	91.6	97.7	92.8	91.9	101.0	9.4	-3.8

SOURCE: Computed from ***Census of Manufactures, 1977*** and ***1982,*** Bureau of the Census, **U.S.** Department of Commerce.
a. Aggregate indexes control for industrial structure.

TABLE 2

For the SMSAs showing higher-than-average labor costs and lower-than-average productivity in 1982 (Philadelphia, Pittsburgh, Chicago, Cleveland, Detroit, and Baltimore) the implications of this finding are particularly sobering. The statistical analysis implies that those SMSAs would have had to possess very significant cost advantages from other sources, such as greater-than-average access to input or output markets, to have been competitive with other areas in the United States. This does not appear to have been the

the group of SMSAs in 1982 (composed primarily of the older SMSAs in the Noah and East) with higher-than-average wages, higher-than-average supplemental income, and lower-than-average labor productivity. It is of interest to examine whether this pattern carries over into the specific industrial sectors that are of greatest importance to the region. ***Table*** 2 shows the 1982 labor-cost measures, described above, broken out by the 18 sectors for which data are available for Cleveland.

Some caution should be exercised in evaluating the results presented in *table* 2. The primary reason for this is the level of industrial disaggregation used in the analysis. In the same way that total Manufacturing measures that do not control for different industrial structures across SMSAs may over- or understate labor-cost differences, the two-digit SIC breakdowns in *table* 2 may reflect differences between Cleveland and the nation in industrial structure at a finer level of disaggregation. This problem, in fact, appears to be a factor in at least two of the sectors shown in *table* 2. It is likely that the very low wage index for Petroleum Products and the very high index for Apparel are largely the result of this issue. However, since these two sectors, together, accounted for less than 5 percent of Manufacturing employment in the region, they have very little impact on the overall indexes.

Nearly 70 percent of 1982 production worker employment in Manufacturing in the Cleveland SMSA was contained in the five sectors beginning with Primary Metals in *table* 2. Each of these sectors showed higher wages and supplemental income in Cleveland than in the nation as a whole. In addition, only one of the five (Electric Machinery) showed labor productivity significantly above the national average. Two others (Fabricated Metals and Transportation Equipment) showed labor productivity within five percent of the average. However, productivity advantages in none of these sectors were large enough to offset the significantly higher-than-average wage and supplemental income rates.

Overall, productivity-correctedlabor costs exceeded the national average in all but two of the reported 18 sectors. In addition, the region's competitive position deteriorated between 1977 and 1982 in eight of the 18 sectors and in three of the region's five largest sectors (Primary and Fabricated Metals, and Nonelectric Machinery). Iabor costs clearly cannot be viewed as a factor enhancing the region's desirability to firms competing in national and international markets.

What impact are differences of the magnitude found in Cleveland likely to have on future employment growth or decline in the region? The research cited in previous sections suggests that the impact was very significant between 1977 and 1982. The findings implied that a labor-cost differential like the one found for Cleveland in 1977 (14 percent) was associated with subsequent employment growth in Manufacturing, which was about 0.8 percent per year less than it would have been if labor costs had been equal to the national average. This represents more than one-fifth of the total difference between the growth rate in the Cleveland SMSA and that in the nation between 1977 and 1982 (when the average difference was about 3.6 percent per year). Although other factors working to Cleveland's disadvantage explain the majority of the region's slower-than-average employment growth in the period, the effect of higher-than-average labor costs cannot be ignored. A 0.8 percent per year shortfall in growth represents about 7,000 Manufacturing jobs in the SMSA over the five-year period from 1977 to 1982.

VI. Conclusions

Manufacturing labor costs varied significantly among large SMSAs in 1982. Most of the variation was attributable to differences in wage rates. When supplemental income was added to wages to get total labor costs per hour, the spread among SMSAs increased, but not by a substantial amount. Correcting for differences among SMSAs in labor productivity tended to increase the differentials by more than the supplemental income adjustment but by a magnitude that was less than the original wage differentials. The data for the 20 largest SMSAs do not support the proposition that higher-than-average wage rates are associated with greater-than-average labor productivity.

Labor costs in 1982 for the Cleveland SMSA were significantly greater than the national average. Of the overall 16 percentage point differential, about 50 percent (or eight percentage points) was due to greater-than-averagewage rates. Another 40 percent of the total difference was attributable to lower-than-average labor productivity, with the remaining 10 percent being due to greater-than-average supplemental income rates.

The higher-than-averagelabor costs in Cleveland are likely to have had a dampening effect on employment growth in Manufacturing in the region. In the group of the 20 largest SMSAs, labor-cost differentials of the magnitude evident in Cleveland in 1977 were associated with employment growth about 0.8 percent per, year less than if labor costs had equaled the national average. This represents about one-fifth of the total difference in Manufacturing employment growth rates between Cleveland and the nation between 1977 and 1982.

The overall implication of this research for the Cleveland area is that, in order to compete effectively with other areas of the country for Manufacturing jobs, other characteristics of the region must be sufficiently advantageous to overcome the region's relatively high labor costs. Many of the same market forces that operated in the past to create the higher-than-averagewages in the region are likely to lead in the future to some moderation, but this is a slow and painful process. Wages in Cleveland as a percent of national average wages declined by only 2 percent between 1977 and 1982 — a period when Manufacturing employment in the region

decreased by 25 percent. In addition, the marginal improvement in the region's competitive position embodied in the relative wage decline was more than offset by a decrease in relative labor productivity in the region.

Perhaps the most important message from the analysis is that there is room for improvement in the SMSA in one component of labor costs—labor productivity—that can be enhanced over a shorter time horizon by actors within the region. Any improvements in this direction will require both a commitment by labor to productivity-enhancing changes in work rules and incentive structures, and by management to invest in the region to maintain and improve the physical plant. Neither group, working alone, can significantly improve the region's ability to compete in national and international markets.

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