A Living Cost Index for SMSAs

Cebula, Richard

Jacksonville University

25 July 1985

A Living Cost Index for SMSAs

A number of recent studies, including Hogan (1983), Cebula (1984), and Cobas (1978) have been concerned with the determinants of either housing cost differentials or overall living cost differentials among SMSAs. Given the obvious significance of such differentials, the purpose of this research note is to develop a geographically comparable cost-of-living index for the 100 largest (as of 1980) SMSAs. From 1966 until 1979 the U.S. Bureau of Labor Statistics compiled comparable cost-of-living data for some 39 metropolitan areas. In more recent years (starting with 1979) the data have been compiled for a maximum of only 24 metropolitan areas. By generating a geographically comparable living cost index for the 100 largest SMSAs, it is hoped that a data base useful to studies of wage differentials, geographic mobility, and other areas of concern and interest can be developed.

It is hypothesized that the cost of living in $SMSA_i$ can be provided by

$$C_i = a_0 + a_1 P_i + a_2 D_i + a_3 I_i + a_4 R_i + \mu \tag{1}$$

where

C_i = the average annual cost of living in $SMSA_i$, in 1977, for a four-person family living on an intermediate urban budget;
a_0 = constant;
P_i = the 1977 population in $SMSA_i$;
D_i = the population density in $SMSA_i$, 1977, expressed in terms of the number of persons per square mile;
I_i = the per capita income in $SMSA_i$, 1977;
R_i = a dummy variable to indicate the existence of right-to-work legislation in the state where $SMSA_i$ is principally located, 1977 ($R_i = 1$ if there exists such legislation; $R_i = 0$ otherwise);
μ = stochastic error term.

As noted in the introduction, the data for the dependent variable, C_i, are obtained from the U.S. Bureau of Labor Statistics (BLS). These data were originally generated by the BLS for a maximum of only 39 SMSAs. Moreover, these data are provided by the BLS only in the form of current dollar amounts; the data are *not* provided in the form of an index. In addition, after 1978 the BLS no longer generated such data for the entire

list of 39 SMSAs; the list was reduced to just 24 SMSAs. Furthermore, the data provided by the BLS in recent years has been "created" by merely applying the inflation rate of the consumer price index to the existing data base. On the other hand, regression equation (3) permits us to generate a living cost *index* for 1977 for any number of SMSAs. Moreover, as elaborated upon in the closing paragraph of this paper, the index is apparently applicable, with only modest variation, to these SMSAs over an extended period of time.

Based upon the study by Cebula (1983: chap. 2), the expected signs on the coefficients are as follows:

$$a_1 < 0;\ a_2 > 0;\ a_3 > 0;\ a_4 < 0. \tag{2}$$

Estimating equation (1) by ordinary least squares yields

$$C_i = +12{,}816.42 - \underset{(-1.99)}{0.00017}\ P_i + \underset{(+4.56)}{0.66249}\ D_i + \underset{(+3.48)}{0.80449}\ I_i - \underset{(-5.44)}{1{,}283.75}\ R_i, \tag{3}$$

$$df = 34,\ R^2 = 0.88,\ F = 29.17,$$

where terms in parentheses are t values. All four of the estimated coefficients exhibit the expected signs. In addition, three of the coefficients are significant at beyond the .01 level, whereas the fourth is significant at the .05 level. The R^2 is .88, so that the model explains nearly nine-tenths of the variation in the dependent variable. Finally, the F ratio is significant at far beyond the .01 level.

On the basis of equation (3), data were gathered for the 100 largest SMSAs in the United States, as of the 1980 Census. In all 100 cases, data on population size, population density, per capita income, and the existence of right-to-work laws were gathered. The coefficients from equation (3) were then used, in conjunction with the data, to generate the cost-of-living index shown in Table 1.

The living cost index shown in Table 1 can be used for a variety of research purposes. But, it should be stressed that, technically, the index shown in the table applies only for the year 1977 and for the intermediate-level urban budget. In the study by Cebula (1983), however, it has been shown that the determinants of geographic living cost differentials are relatively invariant over time; that is, the coefficients are relatively stable and tend to retain their significance levels from year to year. Hence, it is likely that the index shown in Table 1 can be very useful for years other than just 1977. Next, the fact that the index in question refers only to the intermediate budget may not be a major problem. For one thing, the *intermediate* budget may be viewed as that budget, from among those available (low-level, intermediate-level, and high-level), which most closely approximates the cost of living for an *average* family. In addition, the high degree of correlation among the low-level, intermediate-level, and high-level budgets implies a reasonably high degree of applicability of the index to budget levels other than just the intermediate level. Hence, the index in Table 1 may prove to be a highly useful tool, despite imperfections.[1]

Richard J. CEBULA, *Emory University*

[1] Estimates of the living cost index for most of the SMSAs with 1980 populations in excess of 250,000 people have been made and are available from the author upon written request.

TABLE 1

Living Cost Index, 100 SMSAs

SMSA	Cost-of-Living Index
1. New York, NY	120
2. Los Angeles–Long Beach, CA	118
3. Chicago, IL	109
4. Philadelphia, PA	102
5. Detroit, MI	106
6. Boston–Lowell–Brockton–Lawrence–Haverhill, MA	115
7. San Francisco–Oakland, CA	119
8. Washington, DC	112
9. Nassau–Suffolk, NY	113
10. Dallas–Ft. Worth, TX	96
11. Houston, TX	98
12. St. Louis, MO	103
13. Pittsburgh, PA	102
14. Baltimore, MD	102
15. Minneapolis–St. Paul, MN	104
16. Newark, NJ	110
17. Cleveland, OH	108
18. Atlanta, GA	94
19. Anaheim–Santa Ana–Garden Grove, CA	112
20. San Diego, CA	106
21. Denver–Boulder, CO	104
22. Miami, FL	95
23. Seattle–Everett, WA	107
24. Milwaukee, WI	106
25. Tampa–St. Petersburg, FL	91
26. Cincinnati, OH	102
27. Buffalo, NY	102
28. Riverside–San Bernardino–Ontario, CA	108
29. Kansas City, MO	107
30. Phoenix, AZ	94
31. San Jose, CA	110
32. Indianapolis, IN	102
33. New Orleans, LA	93
34. Portland, OR	103
35. Columbus, OH	99
36. Hartford–New Britain–Bristol, CT	105
37. San Antonio, TX	89
38. Rochester, NY	102
39. Sacramento, CA	103
40. Memphis, TN	91
41. Louisville, KY	100
42. Ft. Lauderdale–Hollywood, FL	98
43. Providence–Warwick–Pawtucket, RI	101
44. Dayton, OH	102
45. Salt Lake City, UT	90

TABLE 1—continued

SMSA	Cost-of-Living Index
46. Bridgeport–Stamford–Norwalk–Danbury, CT	115
47. Birmingham, AL	91
48. Norfolk–Virginia Beach–Portsmouth, VA	92
49. Albany–Schenectady–Troy, NY	99
50. Toledo, OH	102
51. Greensboro–Winston-Salem–High Point, NC	92
52. Nashville–Davidson, TN	91
53. Oklahoma City, OK	100
54. New Haven–West Haven–Waterbury–Meriden, CT	106
55. Honolulu, HI	119
56. Jacksonville, FL	91
57. Akron, OH	101
58. Syracuse, NY	98
59. Gary–Hammond–East Chicago, IN–IL	103
60. Worcester–Fitchburg–Leominster, MA	99
61. Northeast PA	97
62. Allentown–Bethlehem–Easton, PA–NJ	101
63. Tulsa, OK	102
64. Richmond, VA	95
65. Charlotte–Gastonia, NC	92
66. New Brunswick–Perth Amboy–Sayreville, NJ	112
67. Orlando, FL	90
68 Springfield–Chicopee–Holyoke, MA	99
69. Omaha, NE	99
70. Grand Rapids, MI	101
71. Jersey City, NJ	121
72. Youngstown–Warren, OH	102
73. Greenville–Spartanburg, SC	89
74. Wilmington, DE	103
75. Flint, MI	105
76. Long Branch–Asbury Park, NJ	112
77. Raleigh–Durham, NC	92
78. West Palm Beach–Boca Raton, FL	98
79. Austin, TX	91
80. Fresno, CA	107
81. Oxnard–Simi Valley–Ventura, CA	108
82. New Bedford–Fall River, MA	108
83. Paterson–Clifton–Passaic, NJ	111
84. Lansing, MI	101
85. Tucson, AZ	88
86. Knoxville, TN	89
87. Baton Rouge, LA	92
88. El Paso, TX	82
89. Harrisburg, PA	101
90. Mobile, AL	88
91. Tacoma, WA	99
92. Johnson City–Kingsport–Bristol, TN–VA	86

TABLE 1—continued

SMSA	Cost-of-Living Index
93. Chattanooga, TN	90
94. Albuquerque, NM	97
95. Canton, OH	100
96. Wichita, KS	96
97. Charleston, SC	86
98. Davenport–Rock Island–Moline, IA–IL	97
99. Columbia, SC	91
100. Fort Wayne, IN	101

REFERENCES

Cebula, Richard J. 1983. *Geographic Living-Cost Differentials* (Lexington, Mass.: Lexington Books).

———. 1984. "The Urban Family Housing Budget in SMSAs," *Social Science Quarterly,* 65 (December):1157–59.

Cobas, José A. 1978. "A Method to Estimate the Bureau of Labor Statistics Family Budgets for All Standard Metropolitan Statistical Areas," *Social Science Quarterly,* 59 (December):546–52.

Hogan, Timothy D. 1983. "Estimating the Urban Family Budget with a Pooled Cross-Section/Time-Series Model," *Social Science Quarterly,* 64 (June):412–16.