Does Proximity Link Job Markets? Some Comparisons Between Occupations and Areas

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In terms of job market integration, metropolitan areas present workers with a wide range of employment prospects. As the Nation has grown and suburbanization has increased, defining the boundaries between adjacent metropolitan areas, especially in the densely populated Eastern seaboard, has become increasingly difficult. The Washington, DC and Baltimore metropolitan areas, for example, are designated by the Bureau of the Census as distinct metropolitan statistical areas (MSA's), even though only 45 miles separate their central cities. In many cases (including Baltimore and Washington, DC) the Federal Government designates a Consolidated Metropolitan Statistical Area (CMSA) as the combined total area of two (or more) MSA's.

How integrated are occupational job markets in adjacent MSA's? Where MSA's are combined into a CMSA because of their proximity, should the CMSA be defined as the relevant job market? This article focuses on these questions, using occupational pay data produced by the Area Wage Survey (AWS) over the years 1976-91.[1] The AWS program collected information on wages and salaries for occupations in which local economic conditions were important in the occupational pay determination of Federal workers and contractors. Pay data for 30 of these occupations are examined.

Determining labor markets

Is it possible to establish whether adjacent metropolitan areas are part of the same labor market? One way is to examine the similarities in changes in pay rates for occupations common to any two adjacent MSA's.[2] When pay rates in adjacent areas vary in a similar way, this may indicate that the rates are determined in the same, or in a larger, job market.[3]

Consider a hypothetical case of construction laborers who work in city A and city B. When a construction boom in city A raises wages of construction laborers in that city, jobs for construction workers in both city A and city B would be part of the same job market if this development caused wages for construction workers in city B to rise by the same percentage as in city A.[4] This result would be expected to occur if the two cities were in the same job market.

However, observation of actual employment relationships suggests that labor markets do not function in such a fluid manner for many reasons, including difficulties in learning about job opportunities, long-term employment relationships, and other factors which inhibit mobility between jobs. Nevertheless, a positive and statistically significant correlation between pay rates often indicate a degree of interdependence in occupational wage developments in adjacent areas.

Area Wage Survey data

Using Area Wage Survey data for Boston, New York, and San Francisco for 1961-73, George Stigler and Robert Sherwin analyzed the interdependence of pay rates for registered industrial nurses and accounting clerks between large metropolitan areas. Although AWS data were not specifically designed to produce time series comparisons, the program did periodically measure pay for jobs having the same occupational specifications over time.

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Following Stigler and Sherwin's approach in using Area Wage Survey data to analyze labor market interdependence for particular occupations, the author examined Area Wage Survey data for four pairs of adjacent MSA's which were surveyed annually from 1976 to 1991.

The correlation analysis recognized that inflation and economy-wide productivity improvements greatly increased the money wages of most jobs in the economy between 1976 and 1991, and that a positive correlation between pay of any two jobs could be simply due to inflation over this period. To remove the effects of economy-wide movements in inflation and general productivity improvements from the occupational pay data, each occupational pay statistic was divided by average hourly earnings (AHE) with the same month and year as the survey reference date for that occupational pay.[5] The result of this was relative wages which could be compared across areas. For example, Area Wage Surveys were conducted in Chicago in May 1976 and in July 1990 as well as in intervening years. Therefore, each Chicago occupational pay statistic for May 1976 was divided by $4:86 (the AHE for May 1976) and each Chicago pay statistic for July 1990 was divided by $9.99 (the AHE for July 1990).[6]

Of the 30 occupations being compared, the only one for which a positive and statistically significant correlation was found among all four pairs of metropolitan areas was that of registered industrial nurse.[7] (See table 1.) Drawing from evidence contained in a larger unpublished study of occupational pay linkages this result seems to reflect a national system of pay linkages among registered industrial nurses.[8] In the larger unpublished study, all possible correlation in the pay of nurses among 14 MSA's selected from throughout the U.S. (55 correlations in all) were examined; only one of these comparisons did not show a positive and statistically significant correlation. (Application of the same procedure to pay data in the other 29 occupations showed that none of these other occupations showed the same extensive pattern of pay linkages.)

In 24 of the other 30 occupations, there was a positive and statistically significant correlation between the relative pay rate measures in at least 1 pair of adjacent metropolitan areas, but not in all 4 areas. These differences between areas perhaps can be traced to the presence or absence of common employing industries in both of the adjacent metropolitan areas. Another possible explanation of the area-specific differences by occupation may be that, generally, only establishments with 50 or more employees were included in the AWS program. If establishments in a particular pair of adjacent areas were owned by the same company, a common company pay policy in all establishments could produce a high positive correlation among wages of the different establishments.

Pay linkages were not observed in any of the areas for peripheral equipment operator, machine tool operator, motor vehicle mechanic, drafter, or truckdriver. It should be noted, however, that these are not low-wage jobs relative to most of the other occupations considered in these comparisons.

Also shown in table 1 is the percent of positive and statistically significant correlation found in each area for the 30 occupational comparisons. To provide a benchmark for the average of positive and statistically significant correlations obtained without regard to proximity, the same procedures were applied to data for 14 MSA's throughout the U.S. Thirty-eight percent of the benchmark comparisons yielded a statistically significant positive correlation. The percentage of significant pay linkages were highest for the Los Angeles-San Diego area (52 percent) and for the Chicago-Milwaukee area (53 percent). Linkages in the Baltimore-Washington, DC area were quite low at 17 percent.

These results suggest that proximity can generate greater pay linkage, but does not guarantee it. This is especially true of the Baltimore-Washington, DC area, the results of which do not support the proposition that the Baltimore-Washington, DC CMSA could adequately define the job market for most of the occupations examined in this study.

—Endnotes—

[1] The Bureau initiated area wage surveys in the late 1940s to provide pay data for clerical and blue-collar jobs common to a wide variety of industries within a metropolitan area. Over time, occupational coverage in the AWS program was expanded. In 1991, the AWS program was replaced by the Occupational Compensation Survey program.

[2] See George Stigler and Robert Sherwin, "The Extent of the Market," *Journal of Law and Economics*, October 1985, pp. 555-585.

[3] Stigler and Sherwin proposed that their analysis could be applied to the study of *any* market—not just occupations in adjacent areas. Although most of their analysis focused on price fluctuations in wholesale commodity markets, the authors did use Area Wage Survey data from 1961-73 to investigate labor market linkages between several large metropolitan areas (New York, Boston, and Los Angeles) for accounting clerks and registered industrial nurses.

[4] Wage *levels* for an occupation may be different in the two cities because of corresponding differences in local amenities, taxes, or public services, but *relative* wages between the cities would not change if they exist in the same job market.

[5] More specifically, the occupational pay series was divided by a 3-month centered moving average as of that date, so as to minimize the effects of possible month-to-month volatility in the AHE at cyclical turning points.

[6] Besides improving comparisons over time, dividing pay data by the contemporaneous AHE also tends to improve comparability of the data reported in the same year across areas. The Area Wage Surveys were conducted at different times of the year in different areas. In a period of high inflation, money wages might increase by a substantial amount between the beginning and end of the year. Dividing by the contemporaneous AHE is equivalent to assuming that money wages in occupational pay increase at the same rate within the year as the AHE.

[7] Conclusions about the statistical significance of the correlations were made using a conventional t-test for correlations with small samples, specifying a 5 percent significance level. See, for example, Ya-lun Chou, *Statistical Analysis with Business and Economic Applications*, Holt Rinehart, and Winston, 1968, p. 618.

Some correlations designated as statistically significant have smaller magnitudes than other correlations not so designated. This occurs because the number of pay comparisons varies across occupations (up to a maximum of 17); the smaller the number of comparisons, the larger the correlation must be to be judged statistically significant.

[8] Anthony J. Barkume and Aaron Cushner, "Co-movements in Locality Pay: Some Implications for Priorities in Data Collection and Some Findings from the Area Wage Surveys," unpublished paper, March 1996. Copies of this paper are available upon request from the authors.

Table 1. Correlations between wages by occupation, 1976-91[1]

Occupations	Adjacent metropolitan areas			
	Washington/ Baltimore	Los Angeles/ San Diego	Chicago/ Milwaukee	Pittsburgh/ Cleveland
Registered industrial nurse	**0.871**	**0.937**	**0.953**	**0.579**
Tool and die maker	-.335	**.949**	**.569**	**.559**
Accounting clerk	-.593	**.941**	**.672**	**.561**
Secretary	**.912**	**.963**	**.979**	.469
Electronic technician	**.809**	**.795**	.509	.222
Order clerk	**.560**	.517	**.691**	.038
Payroll clerk	-.536	**.862**	**.729**	-.429
Messenger	-.381	**.732**	-.151	**.686**
Switchboard operator/receptionist	.461	**.732**	.031	**.808**
Maintenance electrician	-.287	**.662**	**.904**	.041
Maintenance machinist	-.636	**.690**	**.888**	.204
Millwright	**.743**	-	**.668**	.122
Janitor	.172	.468	**.866**	**.777**
Shipping packer	.083	**.716**	.407	**.833**
Material handling laborer	.020	.244	**.646**	**.537**
Guard	-.202	-.306	.528	**.769**
Switchboard operator	-.609	.038	-.237	**.518**
Maintenance carpenter	-.146	**.926**	.426	-.500
Stationary engineer	-.461	-.273	.437	**.685**
Maintenance mechanic	.254	.393	**.637**	.401
Maintenance painter	.236	**.879**	.426	-.113
Maintenance pipefitter	-.382	.282	.539	.159
Order filler	.066	-.573	-.230	**.661**
Warehouse specialist	-.337	-.222	-.031	**.639**
File clerk	-.178	**.704**	-.805	-.374
Peripheral equipment operator	.387	-.489	.461	-.489
Machine tool operator	.090	.147	.107	.436
Motor vehicle mechanic	-.196	.195	-.281	-.446
Drafter	.275	-.113	.422	-.413
Truckdriver	-.302	-.343	.332	-.670
Percent positive correlation	**16.6**	**51.7**	**53.3**	**40.0**

[1] Positive and statistically significant correlations are printed in bold face.

NOTE: Dash indicates no available data for that occupation.