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## Intergovernmental and Functional Aspects of Public Employment Trends in the United States

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Intergovernmental and Functional Aspects of Public Employment Trends in the United States

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15. *Ibid.*, Chapter 531, Inst. 94, October 5, 1967 (revised July 1969) Subch. 4-12.
16. Manpower Administration, *Employer Manpower Planning and Forecasting* (Washington, D. C.: U. S. Government Printing Office, 1970). A far more sophisticated analysis is contained in an unpublished paper presented in 1971 to a NATO Conference by Harry L. Clark of the U.S. Civil Service Commission's Bureau of Policies and Standards: "Problems and Progress in Civil Service Manpower Planning in the United States." Also see: Eli Ginzberg with James W. Kuhn and Beatrice G. Reubens, *Private and Public Manpower Policies to Stimulate Productivity* (Washington, D.C.: National Commission of Productivity).
17. U.S. Civil Service Commission, General Accounting Office, and Office of Management and Budget, *Measuring and Enhancing Productivity in the Federal Sector* (Washington, D.C.: mimeograph edition, June 1972), p. 4.
18. *Ibid.*, p. 43.

## INTERGOVERNMENTAL AND FUNCTIONAL ASPECTS OF PUBLIC EMPLOYMENT TRENDS IN THE UNITED STATES

Roy W. Bahl, David Greytak, Alan K. Campbell, and Michael J. Wasylenko, *Syracuse University*

There is a great deal of policy concern over the issue of employment and compensation levels in the public sector. This concern covers topics ranging from rising direct labor costs and pension benefits, to the unbalanced growth of central city government and other service sector employment, to power inequality in collective bargaining, to the lack of incentive for productivity improvement. While there have been substantive case studies which have made effective use of local data to deal with certain of these issues, aggregate work on the trends in state-local government public employment has been less satisfactory. Any analysis of state and local government employment problems on an aggregate basis depends on the extent and quality of data available. In this context, this article will undertake two tasks: a description of the trends in public employment, and an assessment of the value and comparability of those data which are presently available.

The approach involves examining public employment from the point of view of its budgetary, rather than its efficiency, management, or political implications. Therefore, it is useful to begin the analysis by laying out the background for this type of approach. Accordingly, the material in Section I describes the analytical framework used in viewing government finance problems through expenditures for personnel. In Section II, attention is directed toward a description of trends in levels of public employment and compensation, and, more generally, an examination of the trends in public sector labor intensity is presented. These

trends are all examined on a comparative basis; public sector employment is compared to private, levels of government (federal—state—local) are compared, as are different governmental functions.

Section III presents an evaluation of the data used in the analysis, with particular references to definitional discrepancies in particular functional expenditures between time periods and to problems of comparability of data gathered and published by different agencies or organizations. Any inferences drawn from the trends described in Section II must be tempered by these data problems.

The final section of this article is addressed to implications for future research. With the background provided here, it is possible to suggest the type of data, not now available, which will be necessary for the analysis of public employment problems from the standpoint of policy. The concluding section will delineate the next research steps, the data needs, and the general analytical framework necessary.

### I. Public Employment as a Government Finance Problem

The last decade has seen an outpouring of research on the fiscal problems of state and local governments. Interest has focused more on the expenditure than on the revenue side of the budget, perhaps because of the very rapid and seemingly unpredictable rate of growth of state and local government spending, and because of the

severe financial problems growing out of demands, particularly on urban governments, for more government services. A particular expenditure issue which scholars have addressed is the underlying character of charges in public expenditures. These studies of determinants, usually of per capita public expenditures by function and level of government, if successful, would increase understanding of changes in levels of expenditures and thereby reduce the uncertainties associated with long-term fiscal planning, while providing a better base for choosing among alternative spending policies.

Theoretically, understanding of state and local government expenditure levels may be approached by either a positive or normative analysis.<sup>1</sup> The latter necessitates the development of a pure theory of public expenditures which would explain expenditure decisions. Little progress has been made in this direction. The positive approach relates spending decisions which governments have actually made to specific, measurable characteristics of the governmental unit making the decisions. It is out of this positive approach that the literature known as the "determinants studies" has grown.<sup>2</sup> These studies begin by trying to explain interstate variations in per capita expenditures with a number of independent variables. When statistical significance is found, the independent variable is labeled a "determinant."

Despite the many technical problems associated with this approach, it is useful for the purposes of this article to examine the determinants model rather carefully. The basic relationship is appropriately shown as follows:

$$E_p = f(C, Q) \quad (1)$$

where  $E_p$  = per capita expenditures

$C$  = cost of service

$Q$  = quality of service,

since expenditure variations among governments must be due to either cost or quality differences. However, the quality of the output of the public sector is not readily measured, and, therefore, the quality of service question is generally ignored. Thus, the statistical estimation involves identifying the determinants of expenditure variations without identifying each independent variable in terms of whether it affects cost or quality. That is, the estimation is from

$$E_p = f(X_i, e) \quad (2)$$

where  $E_p$  = per capita expenditures

$X_i$  = exogenous variables

$e$  = a stochastic component.

Clearly, the  $X_i$  represent both cost and quality factors.

In this context, the determinants studies have purported to look almost exclusively at the demand side of expenditure determination, e.g., when found to be significant, the variable, *per capita income*, is interpreted as affecting the level of expenditures through its effects on the level of demand for certain public services, and the variable, *urbanization*, as suggesting a different level of needs for public services.

The supply issues—the effects of supply variables on expenditures—have not often been considered in the literature. However, close examination of the results of these studies shows that, in many cases, either a demand or a supply interpretation could have been given to the same statistical results. For example, higher per capita incomes may reflect the demand for a higher level of services under the  $i^{\text{th}}$  function, or, alternatively, higher per capita incomes may mean that average wage rates in the public sector must be higher to maintain some degree of parity with the private sector, and, therefore, expenditures for any particular function will be higher.

The thesis here is that, while the analytic framework employed in these studies and the interpretation given the results have been heavily biased toward demand considerations, there is good reason to believe that major determinants of public expenditure levels are to be found on the supply side. Consider now a crude analytic framework which might allow incorporation of such supply effects into the standard model. The basic level of cost might be described:

$$C = f(p_z, n_z, n_k, p_k) \quad (3)$$

where  $p_z$  = the price of labor for this function

$n_z$  = total units of labor employed

$n_k$  = total units of non-labor factors employed

$p_k$  = price per unit of non-labor factor

and, substituting back into (1),

$$E = f(p_z, n_z, p_k, n_k, q) \quad (4)$$

which suggests that estimation of per capita expenditure variations might reasonably begin with separate estimation of the determinants of variations in the levels of public sector employment ( $n_z$ ), public sector compensation ( $p_z$ ),<sup>3</sup> public sector production techniques (for example,

$\frac{n_z}{n_z + n_k}$  and public sector output qualities ( $q$ ). This implies a system of relationships,

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$$P_z = f(X_i) \quad (5)$$

$$n_z = f(Z_i) \quad (6)$$

where  $X_i$ ,  $Z_i$  are exogenous determinants of compensation and employment levels.

The nature of such a model might be suggested in very general terms. The level of compensation ( $p_z$ ) could be a function of comparative pay levels in the private sector, of the structural characteristics of the local labor market, and of the rate of population immigration. The quantity of labor employed may be a function of factors such as the public personnel requirements of different configurations of the distribution of urban population (e.g., density). Obviously, other elements of such a model are troublesome. To mention one, there is some trade-off between  $p_z$  and  $n_z$  because of the budget constraint, and this trade-off is considerably affected by the bargaining strength of public employee unions. Still, even this simplistic set of relationships illustrates the method of introducing supply components into the general explanatory model. Without this inclusion in the reduced-form equation to explain per capita expenditures, the exogenous variables, and the results, may fail to show, for example, that per capita refuse collection expenditures in a densely populated, but relatively high-income city are higher because both the number of refuse collection employees and average wage rates are greater. The higher wage rates in this instance may be caused both by wage parity considerations with the private sector in this region and by the greater manpower response to the workload implications of greater densities.

The balance between demand and supply considerations, and, therefore, the final formulation of such a model, deserve more attention than can be given here. Nonetheless, our approach to the public expenditure problem serves to emphasize the importance of examining both the employment and compensation levels as well as their trends, much in the manner that expenditure levels and their trends have been examined in the past. Such a model also suggests the need to examine comparative trends, i.e., between public and private sectors, different levels of government, and among functions, so as to distinguish those functions of the state-local government sector which are exhibiting behavior different from the norm.

## II. Trends in Public Employment and Compensation

This description of the trend in state and local government employment and compensation levels may be divided into four sections. The first compares aggregate employment growth in the public and private sectors. The second section makes a similar comparison on a functional basis, while the third examines employment changes by level of government. The fourth section will deal with two aspects of structural change in public employment—average compensation and labor intensity.

In all cases, the analyses are aggregative and subject to important data limitations and non-comparabilities. The reader is referred to the discussion of such problems in Section III below. Finally, note that the availability of only two, or, in some cases three years of data makes it difficult to establish meaningful long-term trends.

### Public vs. Private Compensation

The different methods used in reporting public and private employment data makes comparisons difficult. Nevertheless, Table 1 shows the levels and rates of growth<sup>4</sup> of full-time equivalent government employment and total private sector employment. The data show that state and local government employment has grown at a faster rate than total national employment, specifically, about 70 per cent faster.<sup>5</sup> In terms of absolutes, over the 1962-72 period, for every 100-person employment increase, 17 were full-time equivalent state and local government employees; and, over the more recent 1967-70 period, 23 were full-time equivalent state-local government employees. It has been argued that employment in the state-local sector is growing faster than total national employment at least partially because technology in the labor-intensive public sector does not keep pace with technology changes in the private sector. If this is the major explanation, then the disparity observed here suggests not a comparison between the public and private sectors, but rather a comparison between the service and production sectors. More specifically, we may expect employment growth rates to differ between services and tangible goods producers. Thus, it may be conjectured that the employment

TABLE 1

## PUBLIC SECTOR AND TOTAL EMPLOYMENT GROWTH RATES: 1962-1970

Sector	(in thousands)			Per Cent Annual Change
	1962	1967	1970	
Local government	4,480	5,509	6,626	4.2
State and local government	5,958	7,454	8,528	4.6
Non-government service industries	8,028	10,060	11,630	4.7
Total employment	55,596	66,030	70,616	2.7

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
 U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).  
 U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).  
 U.S. Department of Commerce, Office of Business Economics, *Survey of Current Business*, Vol. 43, No. 7 (Washington, D.C.: U.S. Government Printing Office, July 1963).  
 U.S. Department of Commerce, Office of Business Economics, *Survey of Current Business*, Vol. 48, No. 7 (Washington, D.C.: U.S. Government Printing Office, July 1968).  
 U.S. Department of Commerce, Office of Business Economics, *Survey of Current Business*, Vol. 51, No. 7 (Washington, D.C.: U.S. Government Printing Office, July 1971).

growth rate in government services is similar to the employment growth rate in nongovernmental service industries. As can be observed from columns 2 and 3 of Table 1, the employment rate of growth in the nongovernment service sector closely parallels that for the state-local government sector, and thus cursory support for the conjecture is provided.

#### Comparison Among Functions

State and local government employment during the 1962-70 period grew at an average annual rate of 4.6 per cent.<sup>6</sup> However, there is much disparity between average annual rates of employment growth between state and local government functions. Using the annual average rates of employment growth in non-governmental service industries (4.7 per cent) as a benchmark, these functions might be divided into three groups: (a) a "slow growth" group (less than 4.7 per cent); (b) a "medium growth" group (4.7 per cent to 6.0 per cent); and (c) a "high growth" group (over 6.0 per cent). Such a taxonomy is presented in Table 3. Of the 21 functions listed in Table 2, nearly two-thirds (13) may be characterized as slow growth functions. It should be noted that all seven of the functions which are exclusively state and local

government functions—i.e., there is no federal employment—are included in the slow growth category<sup>7</sup> (see also Table 4). Of the seven medium and high growth functions, only in water transportation and terminals is the federal government the primary employer, i.e., federal employment accounts for approximately 70 per cent of total government employment in this function<sup>8</sup> (see Table 4). In the remaining six medium and high growth functions, employment at state and local levels is in excess of 70 per cent of total federal, state, and local government employment for that function.

At the state and local level, local government, with a 73.1 per cent share of state and local employment in 1970, continues to be the major employer. However, between 1962 and 1970 there was a high annual average rate of growth (5.7 per cent) in state government employment relative to that in local governments (4.6 per cent), thus increasing the state share of total state and local government employment from 24.8 per cent in 1962 to 26.0 per cent in 1970.

Of the 21 functions listed in Table 2, 11 are provided by both state and local governments. The state and local annual average rates of employment growth between 1962 and 1970 in these 11 shared

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functions are given in Table 5. In only one case, water transportation and terminals, did the local government rate of employment growth exceed that of state government. For hospitals, employment grew at the same annual average rate, 3.9 per cent, for both levels of government. In the remaining nine shared functions, the state government annual average rate of employment growth exceeded that of local government.

A lack of federal government employment data for 1970 precludes a comparison of the effects of the differential growth rates among levels of government on the relative employment share of each level of government for each function. However, the effects of differential state and local government growth on the relative share of each in the 11 shared functions during the mid-'60's can

be seen in Table 4. With regard to the distribution between federal and non-federal government, the state and local government share of total government employment declined in only three functions between 1962 and 1967. Two of these, natural resources and financial administration, were slow growth functions at the state and local level, while health fell within the medium growth category.

The state government share in nine of the shared functions increased between 1962 and 1967. The two functions in which state shares did not increase were public welfare and water transportation and terminals. On the other hand, the local government share increased in only five of the shared functions, i.e., public welfare, hospitals, police protection, water transport and terminals, and corrections. The local government share of

TABLE 2  
STATE AND LOCAL GOVERNMENT  
FULL-TIME EQUIVALENT EMPLOYMENT: 1962 AND 1970

Function	1962 (in thousands)	1970 (in thousands)	Annual Rate of Growth between 1962 and 1970
TOTAL	5,958	8,528	4.6
Education	2,730	4,258	5.7
Highways	524	568	1.0
Public welfare	133	250	8.2
Hospitals	614	830	3.4
Health	80	120	5.2
Police protection	318	450	4.4
Fire protection	154	190	2.7
Sewerage	49	61	2.8
Sanitation other than sewerage	104	125	2.4
Local parks and recreation	90	117	3.4
Natural resources	122	155	3.1
Housing and urban renewal	34	55	6.2
Local airports	9	13	4.7
Water transport and terminals	11	18	6.3
Correction	95	142	5.2
Local libraries	42	57	3.9
Employment security administration	59	75	3.1
Financial administration	180	211	2.0
General control	165	254	5.5
Local utilities	234	267	1.7
State liquor stores	13	15	1.8

Source: U.S. Bureau of the Census, *Census of Governments 1962* Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, *Public Employment in 1970*, Series GE 70-No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).

TABLE 3

CLASSIFICATION OF STATE AND LOCAL GOVERNMENT  
FUNCTIONS BY ANNUAL AVERAGE RATE OF EMPLOYMENT  
GROWTH: 1962-1970

Slow Growth (less than 4.7 per cent)		Medium Growth (4.7 to 6.0 per cent)		Fast Growth (greater than 6.0 per cent)	
Highways	1.0	Local airports	4.7	Housing and urban renewal	6.2
Local utilities	1.7	Police protection	4.4	Water transport and terminals	6.3
State liquor stores	1.8	Health	5.2	Public welfare	8.2
Financial administration	2.0	Correction	5.2		
Sanitation other than sewerage	2.4	General control	5.5		
Fire protection	2.7	Education	5.7		
Sewerage	2.8				
National resources	3.1				
Employment security administration	3.1				
Local parks and recreation	3.4				
Hospitals	3.4				
Local libraries	3.9				

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, *Public Employment in 1970*, Series GE 70-No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).

TABLE 4

RELATIVE SHARES OF FEDERAL, STATE, AND LOCAL GOVERNMENT  
EMPLOYMENT IN SHARED FUNCTIONS: 1962-1967

	1962			1967		
	Federal	State	Local	Federal	State	Local
Education	0.3	14.3	85.4	0.4	16.9	82.7
Highways	0.9	49.2	49.9	0.9	51.4	47.7
Public welfare	53.6	35.5	10.9	2.8	34.9	62.3
Hospitals	18.2	42.5	39.3	15.9	43.9	40.2
Health	29.2	25.7	45.1	29.6	27.6	42.8
Police protection	7.5	10.3	82.2	5.9	11.6	82.5
National resources	59.9	32.2	7.9	60.6	32.8	6.6
Water transport and terminals	71.1	18.4	10.5	69.6	21.7	8.7
Corrections	5.0	60.0	35.0	4.0	60.8	35.2
Financial administration	31.3	28.6	40.1	31.5	29.8	38.7
General control	15.8	10.2	74.0	14.8	12.1	73.1
Housing and urban renewal	27.7	-	72.3	26.8	-	73.2
Local airports	83.3	-	16.7	80.0	-	20.0
Employment security	41.0	59.0	-	47.1	52.9	-

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).

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TABLE 5  
ANNUAL AVERAGE RATES OF EMPLOYMENT GROWTH  
IN STATE AND LOCAL GOVERNMENT SHARED FUNCTIONS: 1962 AND 1970

	State	Local
Education	9.5	5.0
Highways	1.7	0.3
Public welfare	8.9	7.8
Hospitals	3.9	3.9
Health	6.7	4.2
Police protection	6.1	4.2
National resources	3.7	0.5
Water transport and terminals	0.0	9.1
Correction	5.2	5.1
Financial administration	2.6	1.5
General control	8.9	4.8

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
U.S. Bureau of the Census, *Public Employment in 1970*, Series GE 70-No. 1. (Washington, D.C.: U.S. Government Printing Office, 1971).

TABLE 6  
CLASSIFICATIONS OF LOCAL GOVERNMENTS BY ANNUAL  
AVERAGE RATES OF EMPLOYMENT GROWTH: 1962-1967

Slow Growth (less than 4.7 per cent)		Medium Growth (4.7 to 6.0 per cent)	
Local governments	4.2	Local, inside SMSA <sup>1</sup>	5.3
Counties	4.4	School districts	5.6
Local, outside SMSA	2.0		
Municipalities	2.9		
Townships	3.9		
Special districts	3.6		

1. Some of the disparity in employment growth between inside and outside SMSA's may be attributed to population changes. For the period 1960-70, the average annual rate of growth inside SMSA's was 2.1 per cent and outside SMSA's, -0.4 per cent. See: U.S. Bureau of the Census, *U.S. Census of Population, 1960 and 1970* (Washington, D.C.: U.S. Government Printing Office, 1964 and 1971).

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).

employment in education was approximately the same in 1967 as in 1962. The increased local share in public welfare, accompanied by declining state and federal shares, indicates that, relative to other levels of government, the importance of local government in this function is growing. In three functions, hospitals, police protection, and corrections, both state and local shares increased. However, the increase in the state share was greater than that in the local share.

The changing distribution of shares within the 11 shared functions clearly indicates that the participation of state governments is growing in most (i.e., nine) functions and that in those functions in which there was a relative decline in state participation (public welfare and water transportation and terminals), increases in local government participation were sufficient to offset state decline and thereby increased the combined state and local share.

Finally, two functions, housing and urban renewal and airports, are shared between local and federal government alone, while the state and federal governments share one function, employment security. In the federal-local functions, the local share increased, while, in the federal-state function, the federal share increased.

As it was possible to classify the functions of state-local government in terms of their growth (Table 2), it was also possible to classify the units of local government in terms of their annual average rates of employment growth (Table 6). Given that education has been the local government function in which employment gains have been the largest, it is not surprising that employment increases have been most rapid in school districts. Similarly, within the context of recent metropolitan area growth, the rapid employment increase in local government units within SMSA's and the slow growth outside SMSA's is under-

TABLE 7  
AVERAGE ANNUAL PERCENTAGE INCREASE IN  
PUBLIC EMPLOYMENT: 1962-1967

	Average Annual Growth Rate of Public Employment	
	Outside SMSA's	Inside SMSA's
TOTAL	2.0	5.3
Education	2.4	7.1
Highways	-1.6	1.8
Public welfare	5.5	10.7
Hospitals	4.7	3.3
Health	2.4	4.3
Police protection	2.1	3.8
Fire protection	1.7	2.7
Sewerage	1.3	2.6
Sanitation other than sewerage	1.3	2.2
Local parks and recreation	3.4	2.9
Natural resources	-4.1	3.3
Housing and urban renewal	5.0	3.6
Local airports	6.5	2.6
Water transport and terminals	9.8	9.6
Correction	3.5	5.3
Local libraries	-0.8	4.4
Financial administration	-2.0	2.2
General control	4.2	6.0
Local utilities	3.3	2.0

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).

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standable. Surprisingly, however, the rate of growth in hospitals, urban renewal, and airports was greater outside than inside SMSA's, while

natural resources employment declined outside SMSA's, though it increased inside SMSA's (see Table 7). Employment in three remaining local

TABLE 8

AVERAGE MONTHLY COMPENSATION FOR GOVERNMENT AND PRIVATE SECTOR: 1962-1970

Sector	1962	1967	1970	Per Cent Annual Change
Local government	443	564	690	5.7
State and local government	440	565	693	5.8
Nongovernment service industries	482	579	549	1.7
Total employment	445	534	639	4.6

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
 U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).  
 U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).  
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 U.S. Department of Commerce, Office of Business Economics, *Survey of Current Business*, Vol. 51, No. 7 (Washington, D.C.: U.S. Government Printing Office, July 1971).

TABLE 9

CLASSIFICATION OF FUNCTIONS BY RATE OF GROWTH AVERAGE OF COMPENSATION FOR STATE AND LOCAL GOVERNMENTS: 1962-1970

Under 5.0 Per Cent	5.0-6.0 Per Cent	6.0 Per Cent and Over
Local airports (4.1)	Education (5.5)	Hospitals (6.8)
Water transport and terminals (4.2)	Highways (5.4)	Health (6.1)
	Public welfare (5.5)	Police protection (6.2)
	Sewerage (5.3)	Fire protection (6.5)
	Sanitation other than sewerage (5.5)	Natural resources (6.1)
	Local parks and recreation (5.2)	Housing and urban renewal (6.0)
	Local libraries (5.8)	Corrections (6.4)
	Financial administration (5.8)	Employment security administration (6.2)
	General control (5.6)	

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
 U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70 No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).

government units: municipalities, townships, and special districts, increased at slow rates relative to all other local government units.

### Compensation

Trends in the compensation of state and local government employees may be examined in several ways, i.e., through public-private comparisons, comparisons between levels of government, and comparisons between functions. Subject to data limitations, all are considered here.

Again, it may be observed that the rate of growth of average compensation in the state-local sector has exceeded that in the private sector over the 1962-70 period and that, on the average, for every \$1.00 increment received in the private sector, an increment of \$1.26 was received in the public sector (see Table 8). In terms of absolute compensation levels, the average national wage was slightly higher than the average state-local government employment wage in 1962 (\$445 and \$440 per month respectively), but the average state-local government wage was considerably higher by 1970 (\$639 and \$692 respectively).<sup>9</sup> The earlier conjecture, that what is occurring in the public sector is basically an extension of what has been happening in the nongovernment service sector, is not borne out by these data. Average compensation levels rose substantially faster in the state-local sector than in the nongovernment service sector. This discrepancy may be due to the collective bargaining strength of state-local government employee unions which by and large does not exist in the private service sector.

The sources of this rapid increase in state and local government employee compensation may be examined on a function-by-function, or on a government basis. Since certain functions are typically the expenditure responsibility of particular levels of government, these two methods of examining compensation levels and trends tend to converge.

In Table 9 is presented the average annual rates of growth of compensation levels by function for state and local governments. Since the overall rate of growth for average compensation in the private economy is only 4.7 per cent per year, any function listed in the middle or high column grew faster than the national average. What these data show is a general increase across functions which exceeds the national average, and while there is some variation among sectors, the data seem to indicate that the compensation increase is a

sectoral effect (i.e., the state and local sector rather than the result of rapid growth of a few functions). Moreover, the fact that police, fire, health, and hospitals show among the highest increases reinforces the argument that the strength of public employee unions is an important factor in determining public-private sector wage differentials.

It is also useful to examine these trends in light of the level of wages for each function, since a general "catch-up" effect would seem to dictate an inverse relationship between relative wage level and rate of growth of wages for the function. But the average wage levels presented in Table 10 suggest no such relationship; in fact, police and fire average wage levels are among the highest. Again, the strength of union thesis is given added credence.

As noted above, a second way to examine this trend of increase in average compensation is to compare rates of growth by level of government. Such data, showing average annual growth rates, cross-classified by function, are presented in Table 11. Since there was no strong functional explanation for the high rate of growth (i.e., the high growth rate did not result from the inordinately high rates of growth of a few functions), it is to be expected that the rates of growth among governments will not differ substantially. This is borne out by the data in the first two columns in Table 11 which show only a small difference between the growth rates of state government and local government compensation. This trend holds true for most functions, and if there is an overall disparity to be interpreted, it shows that the average rate of increase in compensation for state government employees tended to be higher than that for local government employees for most functions. The same is true for the average level of compensation—state employees earn slightly more on the average and in total for most functions.<sup>10</sup>

It is possible to disaggregate these trends for local governments even further. Not surprisingly, the level of compensation for every function studied was greater inside than outside SMSA's, and the average difference of about 28 per cent is roughly equivalent to the median income differential inside and outside SMSA's. However, the rate of increase in compensation was greater outside SMSA's for some functions, notably education, highways, welfare, hospitals, and recreation. Such a "catch-up" effect may be the result of statewide bargaining or equalizing aid formulas, and requires further study.

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TABLE 10

## AVERAGE COMPENSATION LEVELS BY LEVEL OF GOVERNMENT AND METROPOLITAN STATUS: 1970

Monthly Payroll per Full-Time Equivalent Employee  
(in dollars)

Function	State Government	Local Government Total	Average Compensation for Local Governments Inside SMSA's as a Per Cent of Outside SMSA's <sup>1</sup>	Total State and Local Government
All functions	700	689	1.28	692
Education	784	734	1.24	744
Highways	649	549	1.36	601
Public welfare	616	585	1.31	598
Hospitals	570	500	1.38	537
Health	740	654	1.27	690
Police protection	769	750	1.42	752
Fire protection	—	802	1.37	802
Sewerage	—	626	1.32	626
Sanitation other than sewerage	—	570	1.46	570
Local parks and recreation	—	566	1.24	566
Natural resources	686	548	1.35	668
Housing and urban renewal	—	681	1.35	681
Local airports	—	700	1.52	700
Water transport and terminals	725	735	1.20	733
Corrections	696	707	1.35	700
Local libraries	—	514	1.24	514
Employment security administration	704	592	1.27	704
Financial administration	666	616	1.42	621
General control	879	732	—	661

1. Average compensation computed from U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).

Source: U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U. S. Government Printing Office, 1971).

**Labor Intensity**

A somewhat different way to approach a description of the structure of public employment is to examine the labor intensity of these governments, as measured here by the ratio of payroll to total expenditures. Again, this may be looked at by function and by level of government (see Table 12).

These data show marked differences among functions and governments labor intensity. The state governments are clearly more capital intensive, devoting only about 40 per cent of total expenditures to payrolls as compared with 62 per cent of local governments. This difference is primarily explained by the heavy labor intensity in three functions which are traditionally local—education, police, and fire. Finally, it may be noted

TABLE 11  
 RATE OF GROWTH IN AVERAGE COMPENSATION BY FUNCTION  
 AND BY LEVEL OF GOVERNMENT: 1962-1970

Function	Average Annual Rate of Increase in Monthly Payroll per Full-Time Equivalent Employee			
	State Government	Local Government Total	Average Annual Rate of Increase for Local Government Inside SMSA's as a Per Cent of Outside SMSA's <sup>1</sup>	Total State and Local Government
All functions	6.3	5.7	1.00	5.8
Education	5.3	5.5	0.93	5.5
Highways	5.9	4.8	0.94	5.4
Public welfare	6.2	6.2	0.84	5.5
Hospitals	7.0	6.5	0.98	6.8
Health	6.5	5.8	1.02	6.1
Police protection	6.2	6.2	1.08	6.2
Fire protection	-	6.5	1.03	6.5
Sewerage	-	5.2	0.85	5.3
Sanitation other than sewerage	-	5.6	1.04	5.5
Local parks and recreation	-	5.2	0.82	5.2
Natural resources	6.0	5.3	1.04	6.1
Housing and urban renewal	-	6.2	1.39	6.0
Local airports	-	5.0	1.16	4.1
Water transport and terminals	4.8	3.8	1.00	4.2
Corrections	6.5	6.2	0.98	6.4
Local libraries	-	5.2	1.12	5.8
Employment security administration	6.2	5.6	-	6.2
Financial administration	6.1	5.2	0.88	5.8
General control	5.4	5.8	0.71	5.6

<sup>1</sup> For 1967.

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).

U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).

U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).

that even for individual functions which are performed at both levels, the local government tends to be more labor intensive.

The data were examined in more detail to determine whether there were any clearly discernable trends in labor intensity over the 1962-70 period (see Tables 13, 14, and 15). The analysis shows that for all state and local governments combined, the ratio of payroll to total expenditures rose from 52 to 54 per cent as the result of

increases in this ratio for both state and local governments. At the local level, a relatively large decline in the ratio was observed for the health function. The ratio of payroll to total expenditure declined from .67 to .55 for the health function between 1962 and 1970. The only other function at the local level (see Table 13) exhibiting a decline in labor intensity greater than an average annual rate of one per cent is the airports function. The ratio of payroll to total expenditure

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TABLE 12  
RATIO OF PAYROLL TO TOTAL EXPENDITURE  
BY FUNCTION AND LEVEL OF GOVERNMENT: 1970

Function	State Government	Local Government	Total State and Local Government
All functions	.40	.62	.54
Education	.55	.78	.72
Highways	.21	.33	.25
Public welfare	.09	.17	.12
Hospitals	.74	.62	.68
Health	.55	.55	.55
Police protection	.75	.93	.90
Fire protection	-	.90	.90
Sewerage	-	.21	.21
Sanitation other than sewerage	-	.69	.69
Local parks and recreation	-	.42	.42
Natural resources	.50	.29	.46
Housing and urban renewal	-	.21	.21
Local airports	-	.14	.11
Water transport and terminals	.20	.46	.36
Correction	.72	.77	.73
Local libraries	-	.54	.50
Employment security administration	.82	-	.82
Financial administration	.72	.83	.78
General control	.65	.80	.76

Source: U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U. S. Government Printing Office, 1971).

U.S. Bureau of the Census, *Governmental Finances in 1969-70*, Series GE70, No. 5 (Washington, D.C.: U.S. Government Printing Office, 1971).

on airports decline from .16 to .14 between 1962 and 1970.

However, the functions experiencing declines in their labor intensity were more than offset by the functions which became more labor intensive between 1962 and 1970. Public welfare, police protection, fire protection, sewage, natural resources, housing and urban renewal, water transport and terminals, corrections, and general control all exhibited an increase in their labor intensity of more than one per cent a year. The most noted increase in labor intensity is water transport and terminals, which increased from .21 in 1962 to .46 in 1970, an annual growth rate of 9.9 per cent. However, at the state level the same function declined in labor intensity at an annual rate of 3.4 per cent (see Table 14). While the annual increase in the labor intensity of the police and fire function is 1.2 and 1.4, respectively, it is

noted that the labor intensity of police protection is .93 and that of fire is .90.

At the state level, the only functions in which labor intensity grew more rapidly than local government are highways, hospitals, health, and general control. The labor intensification at the state and local government levels is not simply due to the addition of more employees at a constant wage rate, because this would cause the ratio of payroll to total expenditure to decline. It is more likely to be a result of the increased bargaining power of government unions, thus requiring an increasing proportion of expenditure to be allocated to payroll.

### III. Data Sources and Comparability

In the sections above, payroll and total employment data were examined for aggregate state and

TABLE 13

## RATIO OF PAYROLL TO DIRECT GENERAL EXPENDITURES FOR LOCAL GOVERNMENTS

Function	1962	1967	1970	Per Cent Annual Change
Total	.60	.63	.62	0.5
Education	.75	.77	.78	0.6
Highways	.32	.33	.33	0.4
Public welfare	.14	.18	.17	2.0
Hospitals	.59	.63	.62	0.5
Health	.67	.68	.55	-2.2
Police protection	.85	.91	.93	1.2
Fire protection	.79	.88	.90	1.4
Sewerage	.19	.20	.21	1.3
Sanitation other than sewerage	.67	.71	.69	0.2
Local parks and recreation	.46	.45	.42	-1.0
Natural resources	.26	.23	.29	1.3
Housing and urban renewal	.15	.19	.21	4.5
Local airports	.16	.19	.14	-1.5
Water transport and terminals	.21	.41	.46	9.9
Correction	.63	.76	.77	2.5
Local libraries	.54	.56	.54	0.1
Financial administration	.87	.87	.83	-0.6
General control	.69	.82	.80	1.5

- Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).
- U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).
- U.S. Bureau of the Census, *Census of Governments 1962*, Vol. IV, No. 4, *Compendium of Government Finances* (Washington, D.C.: U.S. Government Printing Office, 1963).
- U.S. Bureau of the Census, *Census of Governments 1967*, Vol. IV, No. 5 *Compendium of Government Finances* (Washington, D.C.: U.S. Government Printing Office, 1968).
- U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).
- U.S. Bureau of the Census, *Governmental Finances in 1969-70*, Series GE70, No. 5 (Washington, D.C.: U.S. Government Printing Office, 1971).

local, local, and federal governments, for non-government service industries, for total national employment for the years 1962, 1967, and 1970. Data are drawn from different sources and some specifics about their measurements should be noted.

Data for 1962 and 1967 on government employment and payroll are available in the quinquennial Census of Governments volumes.<sup>11</sup> Data for 1970 on employment and payroll for state and local governmental units are available in a special Census of Governments volume, GE70.<sup>12</sup> Data for 1970 on expenditures by function for state and local government units is available in

*Governmental Finances in 1960-70*.<sup>13</sup> Data on total employment, wages, and salaries for the nongovernment service industries and total employment in the nation have been taken from *Survey of Current Business*.<sup>14</sup>

It should be noted that all employment data for the government sector in 1962 and 1967 are full-time equivalent employment,<sup>15</sup> and both employment and payroll are measured for only the month of October in each year. However, for 1970 full-time equivalent federal government employment is not available—only total federal government employment (full-time plus part-time) is

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TABLE 14

## RATIO OF PAYROLL TO DIRECT GENERAL EXPENDITURES FOR STATE GOVERNMENT

Function	1962	1967	1970	Per Cent Annual Change
Total	.37	.39	.40	0.8
Education	.57	.52	.55	-0.4
Highways	.19	.19	.21	1.0
Public welfare	.09	.10	.09	0.2
Hospitals	.67	.72	.74	1.2
Health	.55	.57	.55	0.1
Police protection	.73	.79	.75	0.4
Natural resources	.52	.44	.50	-
Water transport and terminals	.26	.24	.20	-3.4
Correction	.60	.68	.72	2.3
Employment security administration	.77	.82	.83	0.9
Financial administration	.73	.72	.72	-0.3
General control	.54	.63	.65	2.3

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
 U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).  
 U.S. Bureau of the Census, *Census of Governments 1962*, Vol. IV, No. 4, *Compendium of Government Finances* (Washington, D.C.: U.S. Government Printing Office, 1963).  
 U.S. Bureau of the Census, *Census of Governments 1967*, Vol. IV, No. 5, *Compendium of Government Finances* (Washington, D.C.: U.S. Government Printing Office, 1968).  
 U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).  
 U.S. Bureau of the Census, *Governmental Finances in 1969-70*, Series GE70, No. 5 (Washington, D.C.: U.S. Government Printing Office, 1971).

available. To make the monthly government payroll data comparable to private sector data, the October payroll reported is multiplied by 12 (months a year) to obtain a yearly payroll figure.<sup>16</sup>

Comparison of these data as between the government and the private sector are hampered by two additional difficulties. First, the employment figures for total national employment and total employment in nongovernment service industries are reported as total full-time plus part-time employment, and not as full-time equivalent employment as in the government sector. Second, total wages and salaries for the nation, and wages and salaries paid in the nongovernment service sector, are reported as annual payrolls for the entire year, and therefore differ from the one-month (October) payroll figures used for the government sector. It is clear that these result in

some incomparability between the data for the government sector, the nongovernment service industry sector, and total national employment. However, if the variance between full-time plus part-time employment, and "actual" full-time equivalent employment is assumed to be the same over time, then our annual percentage changes in employment are comparable as between the public and private sectors. With respect to compensation, the equivalent assumption is that the total payroll amounts reported increase proportionally with full-time plus part-time employment, and with "actual" full-time equivalent employment. This assumption is clearly restrictive, but there seems little by way of an alternative.

Since both the *Census of Governments 1962 and 1967* and the *Public Employment in 1970* volumes are published by the U.S. Department of Commerce, the functional categories of govern-

TABLE 15

## RATIO OF PAYROLL TO DIRECT GENERAL EXPENDITURES FOR STATE AND LOCAL GOVERNMENTS

Function	1962	1967	1970	Per Cent Annual Change
Total	.52	.54	.54	0.4
Education	.72	.71	.72	0.2
Highways	.24	.24	.25	0.5
Public welfare	.12	.14	.12	0.6
Hospitals	.64	.68	.68	0.9
Health	.62	.63	.55	-1.5
Police protection	.83	.90	.90	1.1
Fire protection	.79	.88	.90	1.4
Sewerage	.19	.20	.21	1.1
Sanitation other than sewerage	.68	.71	.69	0.2
Local parks and recreation	.46	.45	.42	-1.1
Natural resources	.44	.39	.46	0.3
Housing and urban renewal	.15	.19	.21	4.2
Local airports	.14	.16	.11	-2.6
Water transport and terminals	.23	.34	.36	5.6
Correction	.61	.71	.73	2.4
Local libraries	.51	.50	.50	-0.2
Employment security administration	.77	.82	.82	0.8
Financial administration	.81	.80	.78	-0.5
General control	.66	.77	.76	1.7

Source: U.S. Bureau of the Census, *Census of Governments 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).  
 U.S. Bureau of the Census, *Census of Governments 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).  
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 U.S. Bureau of the Census, *Public Employment in 1970*, Series GE70, No. 1 (Washington, D.C.: U.S. Government Printing Office, 1971).  
 U.S. Bureau of the Census, *Governmental Finances in 1969-70*, Series GE70, No. 5 (Washington, D.C.: U.S. Government Printing Office, 1971).

ment expenditures and employment are consistent between the two publications. However, while the functional categories are consistent over time, the number of governmental units has changed. This will make increases or decreases in levels of public employment at least partially a function of changes in the number of governmental units, and no attempt is made here to partial out this effect. Table 16 summarized changes in the number of governmental units.

The 21,782 school districts recorded for 1967

show a 12,896 decline in the number of school districts from 1962, reflecting the continuation of the marked decline that has taken place over the last 25 years, primarily as a result of school district consolidation and reorganization.

An increase of 2,941 special districts is also significant. This increase would tend to exert some positive effect on the reported increase in employment and payroll for special districts, and therefore for all local government payroll, expenditures, and employment.

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TABLE 16

## CHANGES IN NUMBER OF GOVERNMENTAL UNITS: BY LEVEL OF GOVERNMENT FOR 1962-1967

Type of Government	Number of Governing Units in:		Change
	1962	1967	
Total	91,237	81,299	
United States	1	1	
State	50	50	
Local	91,186	81,248	
County	3,043	3,049	
Municipality	18,000	18,048	
Township	17,142	17,105	
School district	34,678	21,782	-12,896
Special districts	18,323	21,264	

Source: U.S. Bureau of the Census, *Census of Governments 1967*, Vol. I, *Governmental Organization* (Washington, D.C.: U.S. Government Printing Office, 1968).

#### IV. Implications for Future Research and Data Needs

The objective of this article has been an effort to examine the existing aggregative data on public and private employment and compensation. Other than drawing some overall tentative conclusions from these data, a base is provided for future research. Much of this research will require additional data and some of those needs are outlined here.

Among these research needs is an analysis of the underlying structure of public employment and compensation increases over the past decade. Such an analysis would require, first, the determination of that proportion of the increase in total government labor cost which is attributable to rising wage rates on the one hand, and that which is attributable to expanded numbers of employees on the other, and, second, an analysis of each of these in terms of their underlying determinants. These data, when taken together with measures of changing workloads, are a necessary first step in the direction of examining the real "purchasing power" of increased government expenditures.

A second area where serious fiscal research is needed is the measurement of the budgetary implications of rising employee benefits. The question of the cost to state and local government of retirement systems, and of other fringe benefit

programs, has scarcely been touched from a public finance point of view. Again, the problem is, in part, attributable to insufficient and inadequate data. The policy implications of this research area are considerable—for example, they are directly related to the role of unionization in the public sector, a role only vaguely understood.

A third area is establishing information and norms necessary for the evaluation of public sector compensation levels. If public-private parity is a legitimate goal, much research is needed on the relationship between private sector pay scales and benefits, and those existing in the government sector. However, such work must undertake a detailed cross-classification of government and private employment by occupation level.

A fourth area of research involves analysis of the structure of employment in the government sector. Relatively little is known about the occupation-skill level of government employees, about the male-female participation ratios, or about capital-labor ratios for different government functions.

Finally, an area untouched in this analysis, but of overriding importance, is the measurement of public sector productivity. Related, of course, is productivity measurement in the service sector generally. There are, nevertheless, special characteristics of the public sector which must be taken into account. Fortunately, the examination of this field has been well begun by the Urban Institute

and by the joint project of the General Accounting Office, the Civil Service Commission, and the Office of Management and the Budget. Worth mention, too, are current efforts by many local governments, including New York City.

The public sector will continue to grow. That growth will make a much greater contribution to the well-being of society if their employment issues are better understood. It is to this end that the research suggestions outlined here are made.

#### Notes

1. Jesse Burkhead and Jerry Miner, *Public Expenditure* (Chicago and New York: Aldine-Atherton, 1971), pp. 63-96.
2. For a survey of these studies, see: Roy W. Bahl, "Studies of Determinants of Public Expenditures: A Review," in Selma Mushkin and John Cotton (eds.), *Functional Federalism: Grant-in-Aid and PPB Systems* (Washington, D.C.: State-Local Finances Project, George Washington University, November 1968); and Gail Wilensky, "Determinants of Local Government Expenditures," in John P. Crecine (ed.), *Financing the Metropolis* (Beverly Hills, Calif.: Sage Publications, 1970).
3. Assuming, of course, that compensation as well as employment are variables in the system.
4. The formula used to compute the annual rates of growth is the familiar compound interest formula:  $PV=IV(1+r)^t$ , i.e., the present value is equal to the initial value multiplied by one plus the average annual growth rate raised to the power  $t$ , where  $t$  is the number of years between the present and initial values.
5. This figure was calculated by taking the annual percentage change for employment in state and local government minus the annual percentage change for total employment divided by the annual percentage change in total employment.
6. There was no difference in the rate of increase during the 1962-67 and 1967-70 periods.
7. The functions for which state and local governments are the only employers are fire protection, sewage, sanitation other than sewage, parks and recreation, local libraries, local utilities, and state liquor stores.
8. The relatively rapid rate of growth in this function, however, can be attributed to the addition of a small increment to a relatively small employment base rather than to the addition of a large number of employees.
9. To the extent the public sector wage does not represent a 12-month working year, as, for example, in the case of teachers, these wage levels are not comparable and overstate the actual compensation level in the state-local sector.
10. However, this might be due to the assignment of responsibility within a function. For example, the \$70 difference observed for the hospital function does not necessarily mean that a local employee doing the same job would tend to earn less than a state employee. Rather, this difference may be the result of the state's being assigned certain hospital services which require it to use a greater number of high-paid technicians, professionals, or managers.
11. U.S. Bureau of the Census, *Census of Governments, 1962*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1963).
12. U. S. Bureau of the Census, *Census of Governments, 1967*, Vol. III, *Compendium of Public Employment* (Washington, D.C.: U.S. Government Printing Office, 1968).
13. U. S. Bureau of the Census, *Census of Governments, 1962*, Vol. IV, No. 4, *Compendium of Government Finances* (Washington, D.C.: U. S. Government Printing Office, 1963).
14. U. S. Bureau of the Census, *Census of Governments, 1967*, Vol. IV, No. 5, *Compendium of Government Finances* (Washington, D.C.: U.S. Government Printing Office, 1968).
15. Full-time equivalent employment is calculated by the U.S. Department of Commerce by dividing total payroll by full-time payroll and multiplying the quotient by the number of full-time employees.
16. An alternative would be to divide the total private sector figure by 12 to express it on a monthly basis; the magnitude of the error introduced should be the same in either case.

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