Chapter 3

PUBLIC SECTOR PAY FLEXIBILITY: LABOUR MARKET AND BUDGETARY CONSIDERATIONS

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Introduction

Significant changes in the structure of wages have taken place in the private sector in several OECD countries in the last decade. Wage dispersion has increased substantially in Australia, Canada, Japan, Sweden, the United Kingdom and the United States. In the United States for example, real wages fell by over 20 per cent for young male high school graduates, while they grew for some groups of better educated workers. In addition, the gap in wages between high-income earners and low-income earners expanded considerably in the 1980s, and this trend continues in the early 1990s. For example, the ratio of earnings between a male worker occupying the 90th percentile of the wage distribution and one occupying the 10th percentile expanded from 3.40 in 1979 to 4.05 in 1990.

In this paper we examine how wages in the public sector responded to changes in the external labor market. In general, we find that the public sector has been slow to respond to changes in the private sector wage structure. The increased wage variability observed in the private sector has hardly materialized in the public sector. A significant feature of public sector pay is that real wages fell only slightly for low-skill workers during the 1980s, which is a sharp contrast to the substantial decline in real wages for low-skill workers in the private sector. On the other hand, the workers at the top of the public sector hierarchy have not enjoyed nearly as much growth in earnings as their counterparts in the private sector. We explore several explanations for these different trends. Because there are more workers at the middle and bottom of the wage structure than at the top, these contrasting trends have resulted in faster average wage growth in the public sector than in the private sector during the 1980s. Focusing on the average, however, can be very misleading for specific categories of workers.

There have also been widely varying economic experiences in different regional labor markets in the United States the 1980s. In the early 1980s the South performed poorly while the Midatlantic and New England regions experienced strong economic growth, In the late 1980s, growth slowed in the Midatlantic, New England and Western states, eventually turning into a recession, while the Southern states performed well. These regional shocks have caused widely varying patterns in unemployment across states, affecting the size of state budgets and the demand for public sector transfers and services. We examine the impact of regional economic shocks on

wages in the public sector. State and local governments have been responsive to changes in economic conditions that influence tax revenues and the size of the public sector budget. Wages in the federal government, however, are inflexible in the face of changing local economic conditions.

Finally, we examine the implications of public sector pay inflexibility for economic and personnel outcomes. The magnitude of the gap in earnings between federal and private sector workers in the same occupation differs considerably across regions of the country because private sector pay varies across regions. In areas of the country where private sector wages are low, federal work is comparatively more attractive. We find that the government is able to recruit more highly skilled workers in regions where government pay is relatively high. **Also,** relatively high government wages in some jobs causes long queues of job seekers. On the other hand, we find that government employment **is** less cyclical than private sector employment. In the conclusion we briefly discuss policy reforms designed to increase public sector pay flexibility.

Trends in aggregate public and private sector wages over time

The various levels of government in the United States have quite different wage-setting practices, which in turn influence wage levels and wage flexibility'. Wage setting is highly centralized for the nearly **3** million employees of the federal government. Although federal workers are highly unionized, in most cases federal government employees are prohibited from bargaining over wages[3]. In principal, the pay **of** federal workers is governed by comparability legislation, which is supposed to set the pay of federal workers equal to that of "comparable" private sector workers based on a survey of private sector establishments. The comparability legislation has been skirted every year since 1976, however, and federal pay scales have been set by legislation proposed by the President and approved by Congress. Until recently, the federal government has explicitly tried to pay the same wage to white collar workers in the same grade of work in all areas of the country[4]. The Federal Employees Pay Comparability Act of 1990 is intended to gradually introduce locality pay for white collar employees.

Wage setting for the nearly 15 million state and local government workers in the United States is governed by a myriad of different practices and laws. **Most** states now have legally protected collective bargaining for government workers, and many government workers are permitted to bargain over wages. For some occupations ***(e.g.,*** police and firefighters), binding arbitration is often required to settle disputes that arise in contract negotiations. Roughly 40 per cent of state and local government workers are covered by collective bargaining contracts. Wage contracts are typically negotiated on an occupational or departmental level, and vary from area to area. Pay setting is far more decentralized among state and local governments than in the federal government. For example, teachers in neighboring towns are likely to have different pay scales.

In the private sector of the United States wages are typically set individually by firms and workers. Less than 12 per cent of private sector workers are currently union members (Farber and Krueger, 1992). This is an extremely low rate of unionization compared to most other OECD countries. Consequently, collective bargaining plays a relatively minor role in wage setting in the United States private sector. Also, in comparison to other OECD countries, the United States has relatively modest employment regulations. For example, only about **3** per cent of employees are paid

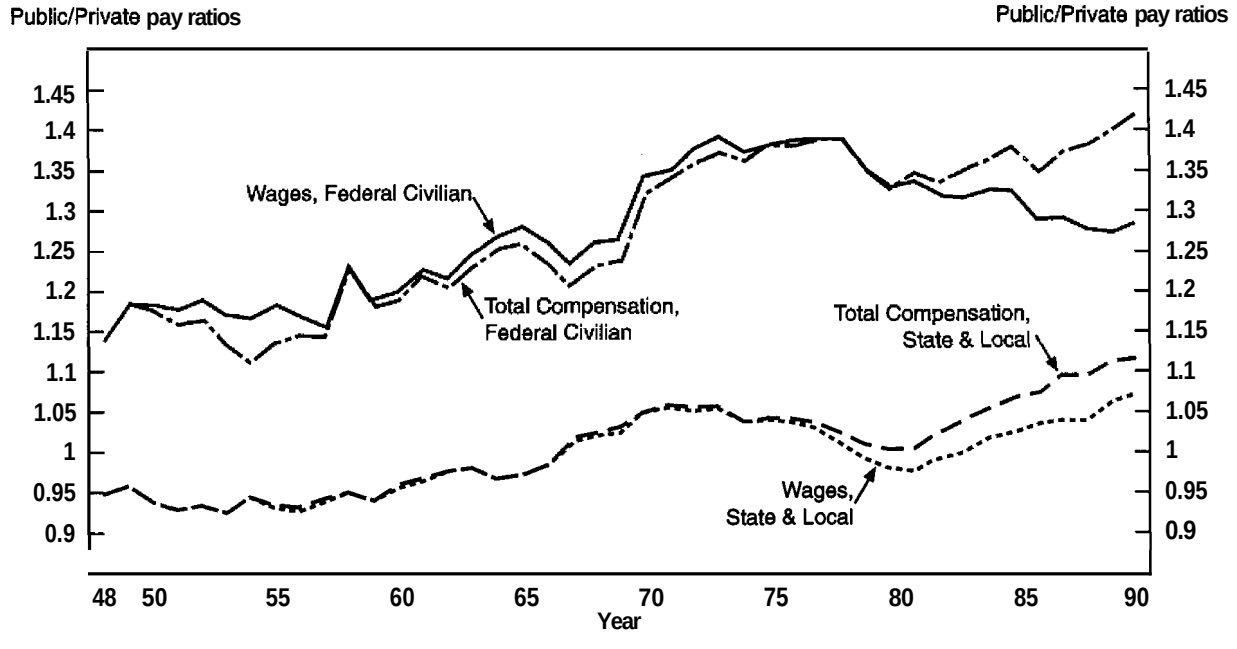
the nationwide minimum wage, which is currently **$4.25** per hour. Employment and pay in the private sector are generally considered to be extremely dynamic and flexible.

We begin by examining long-term trends in the relative compensation of the average public sector worker, compared to that of the average private sector worker. Although throughout this paper we emphasize the importance of comparing public **and** private sector pay for workers with equivalent skill levels, aggregate comparisons are useful because they provide a long-term perspective on public-private pay differentials.

Figure 1 displays data from the National Income and Product Accounts on the ratio of the average wage of government workers to the average wage of private sector **workers** each year between 1948 and 1990. The figure also shows the ratio of total compensation (wages plus fringe benefits) of public sector workers relative to private sector workers.

Several conclusions can be drawn from the figure. Throughout the period, average pay has been much higher in the federal government than in the private sector. The average state and local government worker earned 5 to 10 per cent less **than** the average private sector worker at the beginning of the period, and 10 per cent more at the end of the period.

Figure 1. Public/Private pay ratios, 1948/90
NIPA data



Trends in relative pay were fairly similar for federal and state and local government workers over much of the period. From the mid-1950s to the early 1970s, public sector pay rose more quickly than private sector pay. This period corresponds to a growth spurt in employment demand in the public sector, as employment steadily expanded from 13.6 per cent of the civilian workforce in 1955 to 19.1 per cent in 1975[5]. Many states and towns enacted legislation that was more favorable to public sector unions in the 1960s and 1970s, which enhanced union bargaining power and caused the unionization rate to rise in the public sector (Freeman, 1986). Relative public sector pay declined in the late 1970s as public sector employment growth stagnated. The share of employment in the government sector started a gradual decline after 1975 that lasted through the 1980s. The relative decline in government pay in the late 1970s also coincides with a period of high inflation. Government workers were not as successful at keeping up with inflation as were private sector workers[6]. In the 1980s, despite the declining share of employment in the government, the relative pay of employees in state and local governments again increased. In particular, the pay of school teachers rebounded strongly in the 1980s, after having declined substantially in the 1970s. The relative pay of state and local government employees now stands at an all-time high.

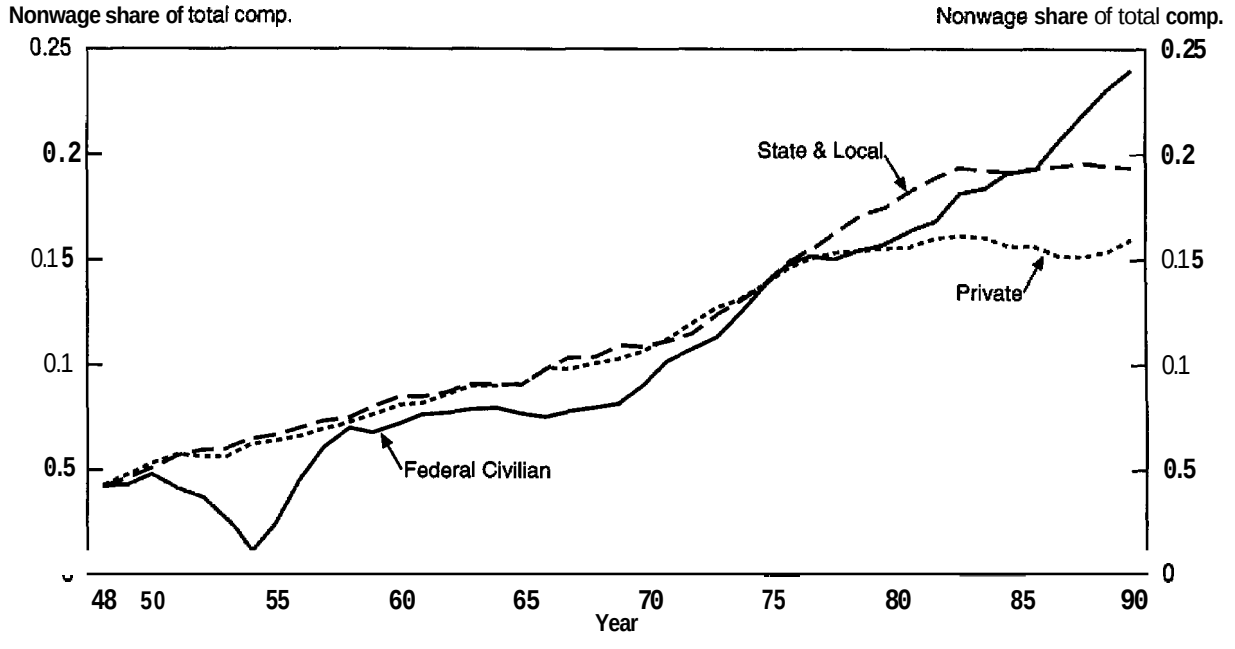
The trend in the pay of federal employees relative to private sector employees in the 1980s is less clear. If one considers just wages, federal government workers lost ground to private sector workers in the 1980s. However, if total compensation is examined, federal compensation rose relative to that of private sector workers because of a relative rise in nonwage compensation. Similarly, state and local government workers' relative total Compensation rose more sharply than their relative wage in the 1980s.

Figure 2 shows that the share of total compensation due to nonwage benefits increased at about the same rate for private sector workers as for government workers between 1948 and the end of the 1970s, from 5 per cent of total compensation to 15 per cent. In the 1980s, the share of compensation due to nonwage benefits continued to rise in the various branches of government, but levelled off in the private sector. Health insurance and pension contributions are the main components of these nonwage benefits. Many private sector firms have made a conscientious effort to rein in fringe benefit costs. The government has not been as vigorous as the private sector in taking steps to reduce the escalation of fringe benefit costs.

Detailed analysis of relative wage changes, 1973-1991

The aggregate trends considered above have several limitations. First, the composition of the workforce in the government differs from that in the private sector. In 1991 some 41.6 per cent of government workers were college graduates, compared to 20.9 per cent of private sector workers; 72 per cent of government workers were in white collar occupations, compared to 54 per cent of private sector workers. The data in Figure 1 do not control for differences in the education level or occupational mix between the public and private sectors. Second, the composition of both government and private sector workforces has changed over time. Third, even if the government and private sector were composed of equivalently trained workers, relative pay trends differ for workers at different skill levels. As shown below, the aggregate trends mask substantial differences in movements in relative pay by education and skill group. This issue is particularly important for understanding trends in relative government-private pay in recent years.

Figure 2. Share of nonwage compensation by sector



Changes in public and private sector average wages by education level

Table 1 presents a more appropriate comparison between government and private sector pay. For selected years between 1973 **and** 1991, the table presents average hourly wages by education level and gender for private sector workers, all government workers combined, federal workers, **and** state and local government workers. Importantly, the wages have been standardized to represent workers with identical characteristics, **and** either 5 or 25 years of work experience[7]. The table is based on our regression estimates using micro data from the United States Current Population Survey **(CPS).** Our statistical methodology is described in detail in the Technical Appendix. All wages have been converted to 1991 dollars. The numbers in parentheses are the wage for each group in a particular year **as** a percentage of the wage **for** that group in 1973-75.

Consistent with Figure 1, the table shows that government workers lost ground to private sector workers in the late 1970s. This conclusion holds for both college educated and high school educated workers, but it is particularly true for workers with just a high school education. For example, in the government, men with a **high** school degree and 5 years of work experience saw their real hourly wage decline by $1.30 (12.5 per cent) between 1973-75 **and** 1979 (from $10.46 to $9.16), while the corresponding group in the private sector experienced only a **$0.34 (3.3** per cent) decline in real wages (from $10.30 to $9.96)'. The period 1973-75 saw the peak of real wage rates in the United States In the 1970s, real wages were eroded by inflation, and this inflation had a more corrosive effect on **pay in** the public sector than in the private sector.

The picture is quite different after 1979. Real wages for less educated private sector workers fell dramatically in the 1980s[9]. For example, between 1979 and 1991 the average hourly wage of men in the private sector with a high school degree and 5 years of experience fell by $2.22 (from $9.96 to $7.74): a 22.3 per cent drop in earning power. Women in the private sector in this same education and experience group saw their real wage rate fall by $0.80 (10.5 per cent). Clearly, these real wage declines represent significant changes in the standard of living of less educated private sector workers. In the public sector, on the other hand, high school educated men lost only $0.44 per hour (4.8 per cent) and women lost only $0.26 (3.3 per cent) since 1979. The wages of less educated public sector workers have not fallen nearly as much as those of their private sector counterparts during the 1980s. As a result, public sector workers with a low level of education now have a substantial earnings advantage over their counterparts in the private sector.

The trend in relative earnings for less educated male state and local government workers is especially noteworthy. In 1979, men with 5 years of experience employed by state and local governments earned 12 per cent less than men with similar characteristics in the private sector. In 1991, this group earned 12 per cent more in the state and local government sector than in the private sector, on average.

The data in Table 1 pertain just to wages, and do not take account of nonwage benefits. Available evidence suggests that accounting for nonwage benefits would exacerbate the growing gap between less educated public and private sector workers. For example, in Katz and Krueger (1991, p. 147) we document that the likelihood of being covered by employer-provided health insurance declined for less educated private sector workers, while it increased for less educated public sector workers during the 1980s.

In both the public and private sectors, real wages for men with exactly a college degree were fairly stable in the 1980s. Women with exactly a college degree had strong real wage growth in the 1980s in the private sector, but only weak growth in the public sector. With the onset of the recession, real wages of college graduates fell between 1988 and 1991 in the private sector (except for women with substantial experience). In the public sector, however, real wages of college graduates continued to be fairly stable despite the beginning of the recession.

The decline in earnings of low-skill workers in the private sector in the 1980s has caused the gap in earnings between college educated workers and high school educated workers to expand. In 1979 young college graduates (male or female) in the private sector had about a 33 per cent earnings advantage over young high school graduates, whereas by 1991 this advantage had expanded to over 60 per cent. By contrast, education-based differentials are much more compressed in the government, with male college graduates earning only a 33 per cent premium over high school graduates in 1991, and female college graduates earning a 37 per cent premium. The premium for college graduates is smaller in state and local governments (27 per cent for men) than in the federal government (52 per cent for men). Note also that in 1991 college educated federal workers earn slightly more than college educated private sector workers. Except for more experienced women, college educated workers employed by state and local governments earn less than their counterparts in the private sector.

Table 1. **Standardised average wage by education, experience, gender and sector for selected year, 1973-1991**

		Education									
		High School (12 years)					College (16 years)				
Experience		1973-75	1979	1983	1988	1991	1973-75	1979	1983	1988	1991
						Private Sector					
Men	5	10.30 (100.00)	9.96 (96.68)	8.60 (83.53)	8.22 (79.77)	7.74 (75.13)	14.02 (100.00)	13.28 (94.73)	12.80 (91.30)	13.18 (93.99)	12.42 (88.60)
	25	14.88 (100.00)	14.63 (98.54)	14.20 (95.41)	13.47 (90.48)	12.33 (82.86)	22.43 (100.00)	20.52 (91.48)	21.21 (94.55)	20.44 (91.12)	19.11 (85.21)
Women	5	7.77 (100.00)	7.59 (97.63)	7.20 (92.68)	6.96 (89.58)	6.79 (87.37)	10.11 (100.00)	10.29 (101.80)	10.68 (105.65)	11.26 (111.40)	10.95 (108.33)
	25	9.05 (100.00)	9.04 (99.86)	X.92 (98.61)	8.97 (99.20)	8.80 (97.24)	11.28 (100.00)	10.81 (95.82)	11.03 (97.73)	12.27 (108.76)	**13.04** (115.60)
						All Levels of Government					
Men	5	10.46 (100.00)	9.16 (87.53)	8.69 (**83.1**1)	8.59 (82.12)	8.72 (83.36)	13.44 (100.00)	11.95 (88.88)	11.49 (85.47)	11.59 (86.24)	11.58 (86.16)
	25	14.85 (100.00)	**14.06** (94.68)	13.81 (92.96)	13.54 (91.12)	12.80 (86.16)	20.85 (100.00)	19.30 (92.59)	19.02 (91.21)	18.34 (87.99)	17.75 **(85.13)**
Women	5	8.36 (100.00)	7.99 (95.59)	7.93 (94.84)	7.98 (95.41j	7.73 (92.50)	11.69 (100.00)	10.66 (91.17)	10.55 (90.30j	10.98 (93.99)	10.61 (90.76)
	25	9.68 (100.00)	9.28 (95.91)	9.28 (95.89)	9.84 (101.61)	9.80 (101.21)	14.20 (100.00)	12.52 (88.17)	12.90 (90.85)	13.45 (94.74)	13.59 (95.70)

Table 1 (cont'd)

Experience		Education									
		High School (12 years)					College (16 years)				
		1973-75	1979	1983	1988	1991	1973-75	1979	1983	1988	1991
		Federal Government									
Men	5	11.90 (100.00)	10.37 (87.18)	10.45 (87.81)	9.15 (76.87)	8.83 (74.23)	15.34 (100.00)	13.29 (86.66)	13.96 (91.03)	13.69 (89.23)	13.44 (87.63)
	25	16.06 (100.00)	14.90 (92.77)	15.40 (95.89)	14.14 (88.07(	13.73 (85.47)	25.44 (100.00)	21.96 (86.33)	23.86 (93.80)	20.62 (81.06)	19.34 (76.03)
Women	5	9.40 (100.00)	8.81 (93.76)	8.72 (92.77)	8.72 (92.77)	8.53 (90.76)	12.94 (100.00)	12.37 (95.60)	12.57 (97.14)	11.31 (87.37)	12.03 (92.96)
	25	12.58 (100.00)	11.24 (89.33)	11.62 (92.31)	11.47 (91.12)	11.83 (93.99)	18.44 (100.00)	12.70 (68.85)	14.52 (78.74)	15.14 (82.12)	15.28 (82.86)
		State and Local Government									
Men	5	10.03 (100.00)	8.80 (87.70)	8.45 (84.28)	8.44 (84.20)	8.66 (86.33)	12.60 (100.00)	11.36 (90.18)	10.68 (84.79)	10.92 (86.68)	11.03 (87.55)
	25	13.91 (100.00)	13.59 (97.70)	12.99 (93.43)	13.10 (94.18)	12.36 (88.87)	17.71 (100.00)	17.12 (96.68)	16.14 (91.12)	17.19 (97.04)	16.95 (95.70)
Women	5	7.87 (100.00)	7.72 (98.14)	7.69 (97.63)	7.67 (97.43)	7.44 (94.55)	11.50 (100.00)	10.47 (91.03)	10.26 (89.23)	10.92 (94.93)	10.41 (90.48)
	25	8.71 (100.00)	8.67 (99.59)	8.73 (100.20)	9.39 (107.79)	9.30 (106.82)	13.74 (100.00)	12.45 (90.58)	12.66 (92.13)	13.27 (96.56)	13.45 (97.92)

Notes: **All wages are reported in** 1991 **dollars, Numbers in parentheses give wage as a percentage** of 1973-75 **wage. See Technical Appendix** for **further details.**

Changes in public-private wage differentials by percentile of wage distribution and education level

Even for workers with the same level of education and experience, there is considerable dispersion in wage rates. Differences in earnings are thought to reflect many factors, including differences in skills, quality of education, compensation for job disamenities, and luck. The government wage structure exhibits less dispersion than the private sector wage structure.

The dispersion in earnings in the public and private sectors can be compared by examining the ratio of earnings between workers at various percentiles of the wage distribution. For example, if the wage structure is more compressed in the government than in the private sector, a worker at the 10th percentile of the wage distribution of government workers will have a larger premium over a worker at the 10th percentile of the wage distribution of private sector workers than will be the case for the corresponding workers at the high ends of their respective wage distributions, say for those at the 90th percentile. To gauge the extent of government wage compression, and of changes in wage compression over time, Figure 3 graphs the proportionate difference in earnings between federal government and private sector workers for each percentile of the respective earnings distributions in 1979 and 1991[10]. **A** positive differential means that the government worker at the specified percentile of the distribution is paid more than the private sector worker who occupies the same relative position in his or her wage distribution. Separate graphs are presented for male college graduates (panel **A),** female college graduates (panel B), male high school graduates (panel C), and female high school graduates (panel D).

Figure **3** illustrates the extent of pay compression in the federal government relative to the private sector. It is clear that the earnings advantage of federal workers is much greater at the bottom part of the wage distribution than at the top **part.** Panel **A** shows that for males with college degrees, the substantial earnings premium of federal workers in the bottom 15 per cent of the distribution increased between 1979 and 1991, but as one moves up the earnings distribution the relative earnings of federal workers declined over this period. For college educated males in the top 20 per cent of the federal earnings distribution, earnings fell by roughly 10 per cent relative to private sector workers in comparable positions in their earnings distribution. Panel B shows a similar pattern for college educated women.

Figure 4 uses the same approach to display wage differentials between state and local government workers and private sector workers **in** 1979 and 1991. Panel **A** of Figure **4** shows hardly any change in the wage distribution of male college graduates in the state and local government relative to the private sector. Panel B of Figure **4** indicates a substantial decline in wages for well-paid female college graduates in the state and local government sector relative to the private sector.

The results for high school graduates are in sharp contrast to the patterns described for college graduates. Panels C and D of Figures 3 and **4** pertain to high school graduates. Between 1979 and 1991, the trends are moving in opposite directions for high school graduates and college graduates. This means that wages grew faster for most high school graduates employed by the government than for private sector workers who are in the same rank in the wage distribution. Thus, it **is** not only the **average** high school educated **worker** who benefited from government employment; almost the **entire distribution** of government workers with a high school education gained on their respective private sector counterparts. Note, however, that the lines are negatively sloped for workers

Figure 3. **Federal/Private (residual) wage differentials by percentile**

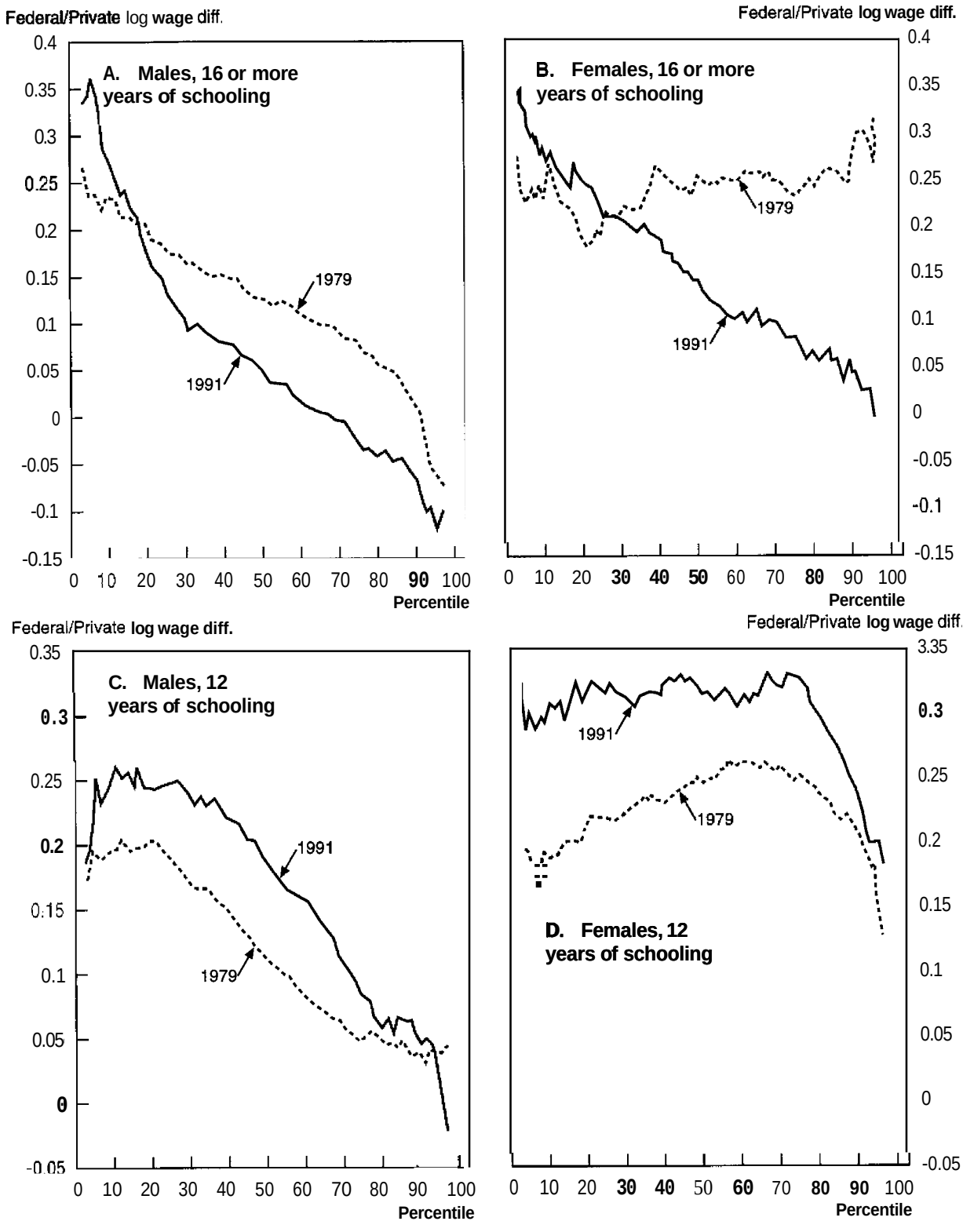
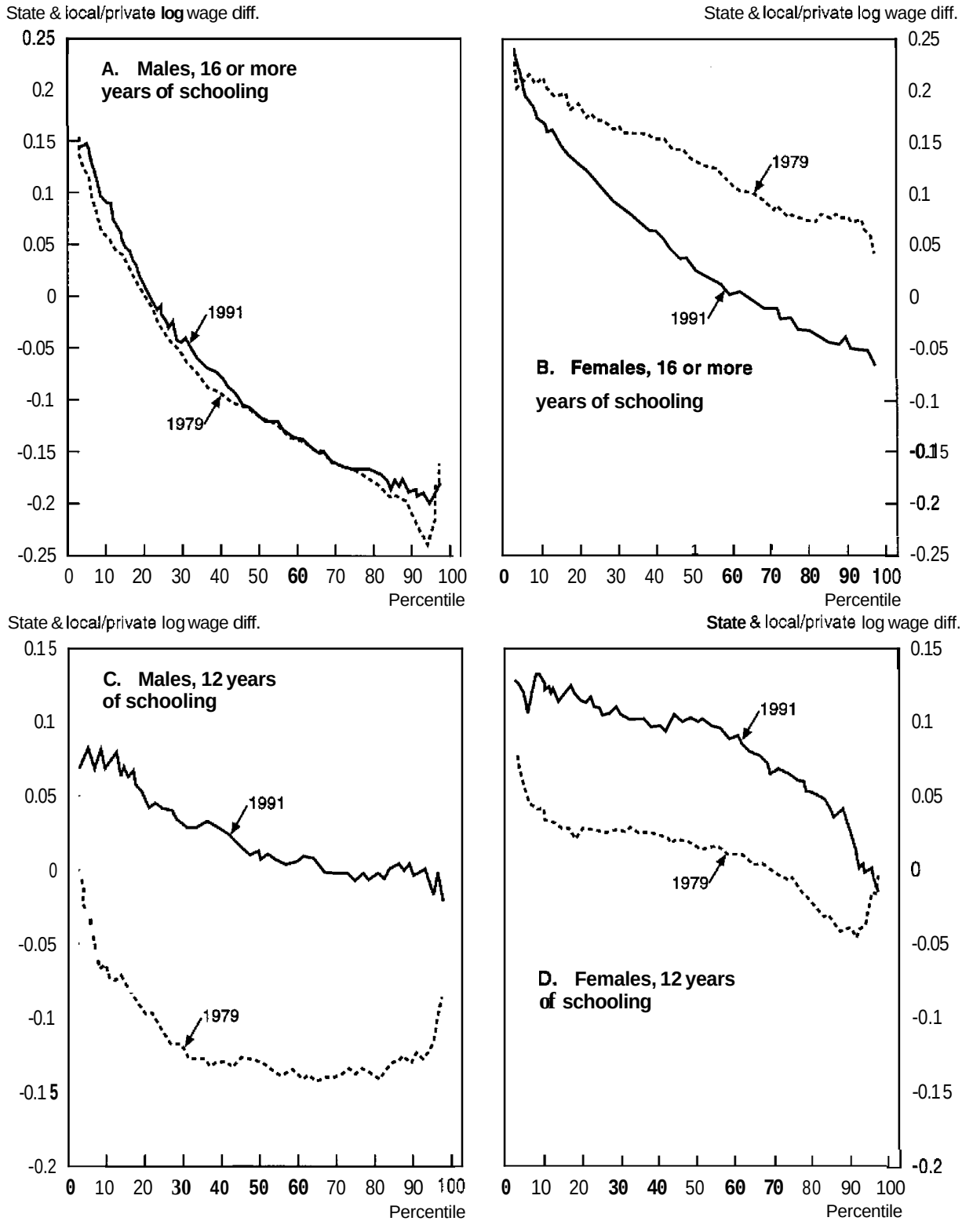


Figure 4. State and local/private (residual} wage differentials by percentile



with a high school education, indicating that for these workers also, the wage in the government is compressed relative to that in the private sector.

Changes in average wages for top executive and professional positions

Given the compression in the government pay structure relative to the private sector, there has been a great deal of concern that the government may be unable to recruit qualified workers at the high end of the skill distribution. This concern **is** especially strong in the federal government, as demonstrated by the formation of the National Commission on the Public Service to study this issue.

Table **2** presents the average annual salaries of high-ranking public officials and top executives and professionals in the private sector in 1980 and 1989. The 1980 salary figures have been adjusted to 1989 dollars based on the CPI. It is well known that top government officials are paid substantially less than many top executives in the private sector. CEO's, law partners, union presidents and university presidents earn more than Governors, Supreme Court Judges, and Congressmen. The table also indicates that the gap in income between top government officials and top private sector employees greatly expanded in the 1980s.

Table 2. **Average salaries of top government and private executives, 1980-1989**

	1980	1989	Percent change
Supreme Court	$122 330	$110 000	-10.0%
Senator/Congressman	$91 291	$89 500	-2.9%
Governor	$75 910	$79 337	+4.5%
8 Top State Officials	$66 686	$67 436	+1.1%
CEO	$914 468	$1 309 081	+43.2%
Union President	$112 854	$128 773	+14.1%
Law Parter	$84 043	$106 486	+26.7%
Surgeon	$157 262	$220 500	+40.2%
University President (Public)	$90 242	$85 **830**	-4.9%
University President (Private)	$86 100	$87 440	+1.6%

Notes and sources:
1980 salaries are converted to 1989 dollars based on the **CPI-A.**
Governor and top 8 officials are taken from ***The** Book **of** the States* and Gold and Ritchie (1991).
CEO **is** based on **the** top 299 companies listed in *Business Week.*
Union president *is* based on the top **32** union presidents as reported in ***Business Week;*** 1984 data are used for union presidents because 1989 data are not available.
Data for law partners are from **TRS** "Partnership Returns," 1983 and 1991.
Data **for** surgeons *are* from *Socioeconomic Characteristics of Medical Practice (AMA),* 1988 *and* 1990-91.
University president refers to the chief executive officer at single institutions, as reported in Levy (1990).
Data **for** university presidents pertain to the years 1979-80 **and** 1989-90.

Top state and federal officials had negative or weak positive real wage growth between 1980 and 1989. For example, the average real income of each state's top 8 government officials increased by only 1.1 per cent in the 1980s. Supreme Court Judges and Congressmen fared even worse: their real salary declined''. In contrast, several of the top private sector positions experienced strong wage growth in the decade. As is well known, CEO income increased dramatically in the 1980s. Our calculations indicate that the average annual salary of CEOs of America's largest 200 companies increased by **43** per cent over the decade, from $914,468 to $1,309,081. And even this dramatic increase understates the true rise in compensation of America's CEOs because the figures exclude stock options and other forms of compensation, which grew rapidly in the 1980s. The data in Table 2 reinforce the main conclusion from Figures **3** and 4: employees at the top of the government hierarchy **are** falling further behind employees at the top of the private sector hierarchy in terms of income.

To summarize, one can envision the wage structure as a pyramid. The top of the pyramid contains the most highly paid, most educated workers. Those at the top of the government pyramid have lost a great deal of ground to those at the top of the private sector pyramid. On the other hand, those at the bottom of the government pyramid have gained substantially on those at the bottom of the private sector pyramid.

Pay and employment flexibility in response to macroeconomic conditions

We next examine variations in public and private sector pay across **states,** and analyze the responses of public **and** private sector pay to changes in local labor conditions. Private sector wages vary considerably across states and cities in the United States Because the federal government generally pays the same wage nationwide to white-collar workers who are in the same occupational grade, the federal-private pay differential varies greatly by location, and federal wages are rigid in response to changes in local economic conditions. State and local government wages are far more decentralized. Furthermore, state and local governments face hard budget constraints (i.e., most states cannot run deficits). Economic shocks that affect the tax revenues of state and local governments appear to be translated into wage adjustments.

Brown and Medoff (1988) document that a local government's "ability to pay," as measured by the median family income in the jurisdiction, influences government workers' pay. They find that local government workers are paid more if they are employed in wealthier areas, other things being equal. Brown and Medoff further find that larger local governments pay higher wages than smaller ones, other things being equal[12]. Similarly, Freeman (1987) finds that government workers' pay is directly related to the size of the government budget. One problem with correlating wages and budget size, however, is that payroll is a large component of the budget, and the direction of causality may run from high wages to large budgets, rather than vice versa. Nevertheless, these findings suggest that a government's budgetary situation influences pay.

In Katz and Krueger (1991), we estimated the extent of geographic variation in pay in the public and private sectors. State and local government pay tends to **be** higher **in** states where the private sector wage is relatively high, and lower in states where the private sector wage is relatively low. On the other hand, there is little systematic relationship between federal and private sector pay across states.

We further explore the effects of local economic conditions on pay in the public and private sectors using CPS data. Specifically, we examine the extent to which changes in state-level unemployment rates affect wage growth in the private, state and local government, and federal government sectors. Changes in local unemployment rates reflect changes in local economic conditions that affect state and local government budgets, as well as the demand for labor in many private sector firms (especially those operating in localized product markets). When unemployment rises, available government revenues decline. In Figure 5, we plot changes in state wage levels (adjusted for differences in workforce composition) against changes in state unemployment rates from 1979 to 1989 for each sector[13]. The figure shows a strong negative response of private sector and state and local government wages to changes in state unemployment rates, but essentially no response of federal wages to changes in state economic conditions. The employment-weighted regressions of changes in state wage differentials on changes in state unemployment from 1979 to 1989 yield:

Private Sector: $dw = -0.015 - 0.023\,du, \quad R^2 = 0.25$
$(0.009)\ (0.006)$

State and Local: $dw = 0.028 - 0.017\,du, \quad R^2 = 0.14$
$(0.010)\ (0.006)$

Federal: $dw = 0.001 + 0.005\,du, \quad R^2 = 0.01$
$(0.009)\ (0.009)$

where dw is the change in the standardized log wage differential and du is the change in the state unemployment rate (measured in percents)[14]. The standard errors of the estimates are in parentheses.

Increases in unemployment are associated with declining wages in the private sector and state and local governments, but with hardly any response in the federal government. Although the response to unemployment is greater in the private sector than in state and local governments, the difference between the sectors is not statistically significant.

Much anecdotal evidence also supports the view that state government workers' pay responds to budgetary and local economic conditions. For example, Governor Wilson of California recently pressed 21 government employee unions to accept a 5 per cent pay cut because the state has been especially hard hit by the 1990-91 recession[15]. On the other hand, we find that wages of state and local government workers in New England have not declined relative to the nation during the 1990-91 recession, despite a substantial increase in unemployment and a decline in private sector wages. In the case of New England, state and local government pay may adjust with a lag, with employment bearing the initial brunt of budgetary shortfalls.

Employment in the government is generally considered to be less cyclical than employment in the private sector. Freeman, for example, finds that in six of the seven national recessions after 1953, state and local employment moved countercyclically. Local economic conditions may cause government employment to move procyclically, however. In Table 3 we report descriptive regressions on the relationship between employment growth and the change in the unemployment rate

Figure 5. Changes in state wages and state unemployment

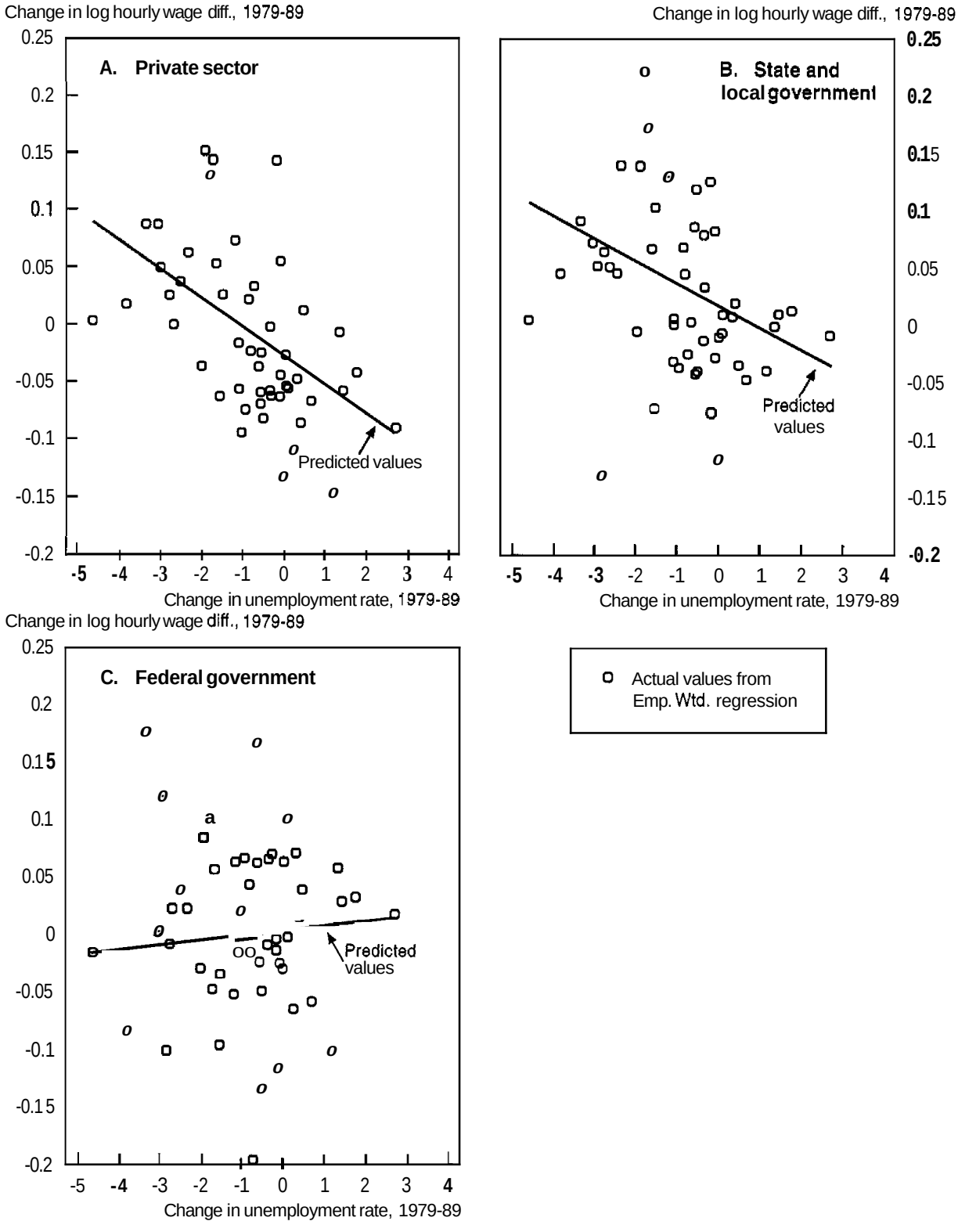


Table 3. **Employment growth equations for the government and private sector, 1985-90**

	Government A ln E	Private A ln E
Intercept	*0.06* (0.02)	*0.03* (0.02)
Change in unemployment rate	-0.23 (0.89)	-1.23 ***(0.59)***
Population growth rate	**0.54** (0.25)	1.03 (0.17)
R^2	*0.09*	**0.45**
Number of observations	**51**	**51**

Notes:
Dependent variable **is** change in log employment, 1985-90.
Standard errors are in parentheses.
Data are from ***Geographic Profile of Employment*** *and* ***Unemployment, 1985 and 1990,*** United States Department of Labor, Bureau of Labor Statistics, Washington DC: United States Government Printing Office

across states between 1985 and 1990 in the government and private sector. The regressions indicate a weak, statistically insignificant, negative relationship between the change in a state's unemployment rate and the growth of government employment in the state. By contrast, private sector employment growth is strongly procyclical.

Explanations for government wage structure inflexibility

Understanding why the public sector wage structure has been inflexible in spite of significant changes in the private sector wage structure is necessary to reform the system[16]. **A** complete explanation must also address our finding that the average **level** of state and local government pay appears to be responsive to changes in local economic conditions. Below we list and evaluate four possible explanations for government pay rigidity. Although we conclude that none of these explanations is solely responsible, we suspect that each helps to explain why the government wage structure has been inflexible.

A frequently cited explanation for government pay inflexibility is that the government is a large employer, and large employers tend to be bureaucratic and slow to adjust to external changes. Indeed, the federal government is by far the largest single employer in the United States, so it would be natural for it to respond even more slowly to changing market conditions than do large private sector firms. We doubt that this is a sufficient explanation, however. The reason for our skepticism **is** that large private sector firms adjusted their wage structures very quickly when wage dispersion increased in the 1980s. In fact, we find that real wages of high school-educated workers fell even more in large (over 1,000 workers), multi-establishment firms than in small firms between 1979 and 1988. Thus, large bureaucratic organizations in the private sector were quite flexible **and** expeditious in responding to changing labor market conditions. It may still be the case, however, that

government bureaucracy prevents the government wage structure from recognizing and responding to new labor market conditions.

As already noted, the nationwide pay scale of the federal government, which allows few exceptions across regions, causes pay inflexibility. One defense of this policy is that it is administratively easy to apply. The nationwide pay scale enables the government to transfer workers to different locales without adjusting their pay. However, many large private sector firms with employees in several regions overcome this problem by having region-specific pay schedules,

The public sector is highly unionized, and unions are widely believed to compress wage structures and create rigidities (see Card, 1991 and Freeman, 1980). We find that government wages *are* more compressed in areas where public sector unions are stronger, but unions are, at best, only a partial explanation for government wage structure inflexibility. Specifically, if we divide the states into those with a high degree of public sector unionization (coverage rate over 60 per cent) and those with a low degree of public sector unionization (coverage rate under 30 per cent), we find that the college-high school premium is greater in states where unions are weaker. However, in states with both low and high levels of public sector unionization, the public sector has been more rigid than the private sector in responding to increased wage dispersion.

The unique political role played by public sector unions may help to explain our findings that state and local governments adjust the mean wage of employees in response to economic shocks but not the gap between high- and low-skill workers, and that state and local government employment is not very cyclical. Public sector unions gain bargaining power by encouraging their members to vote favored candidates into office. As a result, public sector unions would be more willing than private sector unions to forgo wage gains to maintain a high level of employment, other things being equal. Political clout depends on numbers, and larger unions will have more political clout, which can be used in later bargaining rounds to increase wages.

Some economists have argued that the government labor market differs from the private sector labor market because the government does not have an incentive to maximize profit, as do most private sector firms. Preliminarily, one should note, however, that government officials do have a strong incentive to minimize costs because constituents prefer to obtain government services at the lowest possible cost, in order to reduce their tax burden. The incentive to minimize costs could be expected to induce the government to adjust its wage structure in response to changing labor market conditions. Private, not-for-profit organizations form an interesting contrast. These organizations also have no incentive to maximize profits, but they do have an incentive to minimize costs so they can provide their services to the largest possible number of recipients. Additionally, nonprofit organizations often have a social mission that is similar to that of a government.

Interestingly, we find that for men, nonprofit firms have a much more compressed wage structure than do private, for-profit firms. For women, however, the wage structures of nonprofit and for-profit private sector firms are similar. Overall, the level of wage compression in the nonprofit sector is similar to that in the government. However, in the 1980s wage differentials based on education increased in the nonprofit sector by far more than they increased in the public sector, but not by quite as much as they increased in the for-profit, private sector. Thus, the nonprofit sector is a middle ground between the government and private sectors.

A final explanation is based on political considerations: voters just do not like to see public sector officials earn high salaries, especially in a period when average salaries in the private sector have been stagnant or falling. A vivid example of this point is the widespread public opposition to the Congressional pay raise proposed in 1989. For example, a Gallup Poll found that 80 per cent of Americans opposed a Congressional pay raise, even though the vast majority had no idea how much Congressmen are paid (see *Gallup* ***Report,*** No. **281,** February 1989). Public opposition to pay raises for top government officials applies to highly visible state and local officials as well[17]. Moreover, the political constraints that limit the pay of top government officials tend to filter down to lower levels in the job structure because most organizations prefer to pay workers in leadership positions more than those beneath them.

Political pressure tends to compress pay at the top of the government wage structure, but this is only part of the inflexibility that we have documented. Political pressure may have the opposite effect for low-wage earners because unions primarily represent workers in the middle and bottom of the wage distribution. Furthermore, there is an undercurrent of belief that "fairness" should enter into government wage setting, which in practice has meant low wage dispersion and fairly uniform wage increases. For example, in the federal government the entire General Schedule (GS) is typically increased each year by the same percentage amount, regardless of grade level[18]. When the wage structure in the outside market is changing, uniform wage increases will quickly cause the government to stray from paying competitive **wages** at some levels. Furthermore, when budgetary problems arise, political pressure legitimizes across-the-boardreal wage cuts for government workers, which may explain why average wages of state and local government workers' respond to regional economic conditions.

Political considerations may also explain the fact that federal government workers are paid more than state and local government workers who possess the same level of education and experience (see Table 1). In particular, voters probably find it easier to hold state and local government officials accountable for public sector workers' pay, because the elected officials who are responsible for setting pay are clearly identifiable. For example, the local school board could be voted out of office if teacher raises were well above the market level. On the other hand, because of the scale and scope of the federal government, it is difficult to know who is responsible for setting the pay of specific groups of Federal workers. Moreover, each federal legislator is just one of hundreds of representatives who vote on scores of issues besides federal pay, which would further diffuse voter sentiment.

Although the importance of political pressure is difficult to test directly, casual observation and indirect evidence lend some support. For example, Borjas (1980) finds that federal agencies with small and well-organized constituencies are able to use their political influence to increase wages. Furthermore, the lack of strong empirical support for the other explanations of pay rigidity noted above suggests that some other factor must also be at work.

International evidence

The most distinctive developments in the United States wage structure in recent years have been the increase in overall wage dispersion and the decline in the wages of less educated workers relative to those of highly educated workers. Both of these developments occurred in the private

sector. The government has been slow to react to the changing private sector wage structure, causing even greater compression in the government wage structure. Thus, we find that a key component of government wage compression relative to the private sector is the extent to which wage dispersion increased in the private sector. Here we briefly consider the extent to which wage dispersion and educational wage differentials have increased in other countries.

Table 4. **Wage inequality for full-time workers, selected OECD countries, 1979-90** [1]

	Ratio of Wage of 90th Percentile Earner to 10th Percentile Earner			
Country	1979	1985	1987	1990
a) Males				
United States	3.42	3.90	3.97	4.05
United Kingdom	**2.41**	2.83	3.00	3.19
Canada [2]	3.16	3.67		
Japan	2.59	2.77	**2.75**	**2.83**
France	**3.29**	3.25	3.39	
Germany I	2.20	2.10		
Germany II		2.59	2.51	
b) Females				
United States	2.61	3.19	3.42	3.56
United Kingdom	2.32	2.66	2.77	3.03
Japan	2.18	2.20	2.32	2.29
France	**2.61**	2.53	2.72	
c) Males and Females, Blue Collar Workers only				
Sweden	I .35	1.35	1.36	1.40

Notes:

1. The samples consist of full-time workers with the exception of Japan. The wage inequality measures for Japan refer to regular workers. Wages are measured by hourly earnings for the United States, United Kingdom, France and Sweden; weekly earnings for full-time, full-year workers covered by the social security system for Germany I; and gross average monthly earnings plus holiday allowances based on data from the German socioeconomic Panel for Germany II.
2. The Canadian data are for the years 1980 and 1985.

Sources: The data for the United States, United Kingdom, France, and Japan are from Katz, Loveman, and Blanchflower (1992); the data for Canada are from Davis (1992); the data for Germany are from Abraham and Houseman (1992); and the data for Sweden are from Edin and Holmlund (1992).

Rising wage inequality in the 1980s is a widespread phenomenon. **As** Table 4 documents, wage inequality has risen in several other developed countries. Furthermore, Davis (1992) and others have found that highly educated workers enjoyed faster wage growth than less educated workers in seval countries during the 1980s, including Australia, Canada, Sweden and the United Kingdom. Economists have focused on two main explanations for these changes in the wage structure: a) "skill-biased" technological progress that has increased the productivity of high-wage workers relative to low-wage workers; b) increased international competition that has put low-wage workers at a disadvantage[19]. Although these countries may have experienced a similar set of underlying economic **shocks,** each country's particular labor market institutions and laws tend to mitigate the effects of these shocks differently. Clearly, the extent and timing of changes in the wage structure are not the same in all countries. Nevertheless, the wage structure has changed in several OECD countries.

Table 5. **Ratio of average wage of nonmanual workers to average wage of manual workers; public and private sector industries in the UK, 1976-1989**

	Private Sector Industries	Public Sector Industries
Year	**Men**	
1976	**1.210**	1.536
1979	1.219	1.436
1984	1.387	1.552
1989	1.536	1.619
Change 1976-89	0.326	0.083
Change 1979-89	0.317	0.183
Year	**Women**	
1976	1.030	1.469
1979	1.053	1.459
1984	1.242	1.513
1989	1.377	1.611
Change 1976-89	0.347	0.142
Change 1979-89	0.324	0.151

Source:

Authors' calculations from Published tables of the **U.K.** *New Earnings Survey,* 1976, 1979, **1984 and** 1989.
Public sector industries consists of public administration **and national** defense, sanitary services, education, medical services, and water supply; private sector consists **of** all other industries except electrical power, **coal,** other inland transport, postal and telecommunications, and other transport equipment.

France and (especially) Germany stand out as the two major exceptions to the trend of rising wage inequality[20]. Interestingly, in these countries the government is considered an important pattern setter for wage bargaining in private sector industries.

The United Kingdom has experienced as sharp an increase in wage dispersion as the United States. We have investigated whether these changes were strictly confined to the private sector, or whether the British government responded to external changes. Although the available data do not allow as detailed an analysis as we have performed for the United States, we have been able to compare average wage changes by occupation in the public and private sectors in the United Kingdom. Specifically, we categorized industries into those that are primarily public sector and those that are primarily private sector, and calculated the average wage for manual and nonmanual workers in each sector for selected years between 1976 and 1989. Table **5** reports the ratio of the average nonmanual worker's pay to the average manual worker's pay by sector. The results suggest that the wage structure in public sector industries in the United Kingdom has also been slow to respond to changes in the private sector wage structure. Unlike the United States however, highly skilled workers (nonmanual workers) receive a greater premium over less skilled workers (manual workers) in the public sector than in the private sector in the United Kingdom. This finding may be a result of the different mix of manual and nonmanual workers in the public and private sectors. For our purposes, the changes within sectors are most relevant.

In their analysis of the Australian **wage** structure, Gregory and Vella (1992) similarly find that wage inequality increased substantially more in the private sector than in the public sector in the 1980s. For example, between 1978 and 1990 they estimate that the wage differential between the 90th and 10th percentiles of the male wage distribution expanded by 17 per cent in the private sector and only 8 per cent in the public sector. Thus, the United States is not the only country where the government has been slow to respond to changes in the private sector wage structure.

Economic implications of government pay structure inflexibility

What effect does pay inflexibility and wage compression have on economic performance and personnel outcomes? For low-skill jobs, pay compression is likely to raise the level of "wait" unemployment because many workers may **be** willing to queue for higher-wage government jobs rather than take lower-wage private sector jobs. For example, a community in New Jersey recently reported that nearly 1 000 job seekers applied in person for two policemen's positions[2]'. Furthermore, the government has a strong incentive to subcontract work to private companies in jobs in which it pays a relatively high wage. On the other hand, for high-skill jobs the government pays less than the private sector. This is likely to make it difficult to recruit and retain qualified workers in these positions, which in turn would inhibit the government's ability to perform its duties. Moreover, performance ratings are likely to be inflated in high-skill jobs, making it difficult to implement merit pay.

On an aggregate level, we find that pay setting in the state and local government sector responds to local economic conditions, although with a lag. Moreover, state and local government unions appear willing to sacrifice wage gains to maintain employment levels (see Freeman, 1987). **A** vast majority of public sector employment is in state and local governments. We suspect that at a macroeconomic level government pay inflexibility does not generate much excess unemployment

over the business cycle, because the overall level of state and local government pay tends to be responsive to the business cycle.

Personnel outcomes in the government will be strongly influenced by wage inflexibility. Our analysis suggests that the government recruits better trained workers in areas where it pays a high wage relative to the average in the private sector. Specifically, we examined how the level of education of Federal government employees relative to that of private sector employees in selected occupations varies with private sector pay across states[22]. Figure 6 shows that the government employs more highly educated secretaries (relative to the average education level in the private sector) in states where private sector pay is low. For example, 9 per cent of federal secretaries have a college degree in North Carolina, a low-wage state, while only 2.5 per cent of federal secretaries have a college degree in New York, a high-wage state. This is exactly what one would expect because the pay scales of federal secretaries are the same in all regions of the country, so federal jobs offer relatively greater remuneration in states where private sector wages are low. We have found a similar relationship for the other occupations we examined: clerks, mail and file staff, typists, nurses, and nurse assistants.

The number of applications for job openings in the government tends to respond to relative wages. In Katz and Krueger (1991) we show that application rates have been rising for federal blue collar jobs and declining for federal white collar jobs during the 1980s, mirroring trends in relative

Figure 6. Relative education vs. private sector wage differential: federal secretaries

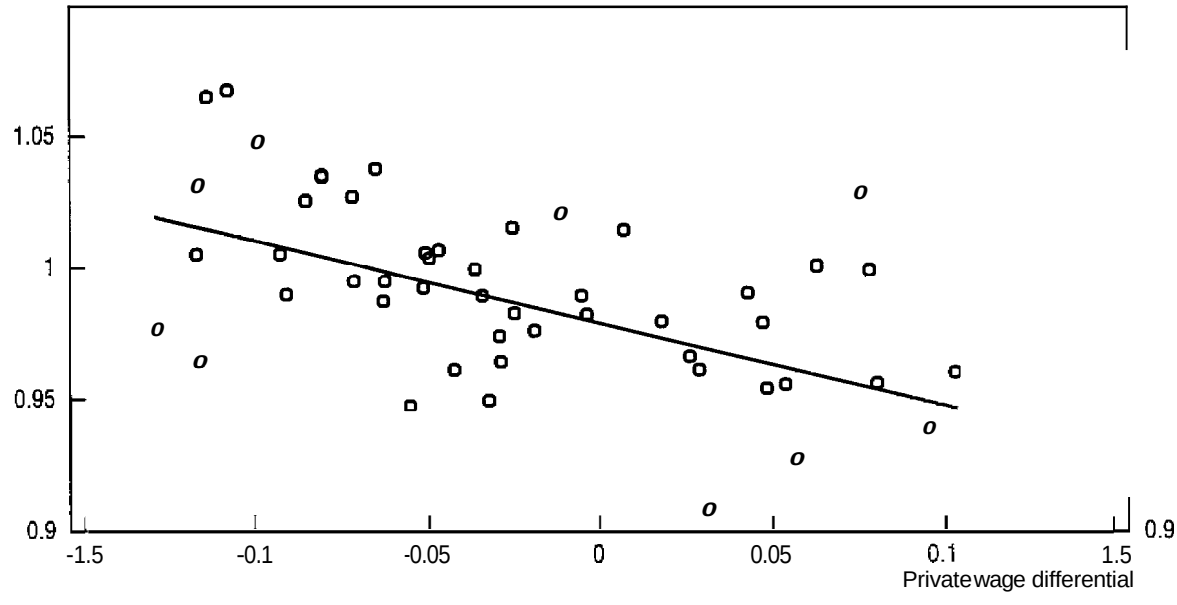
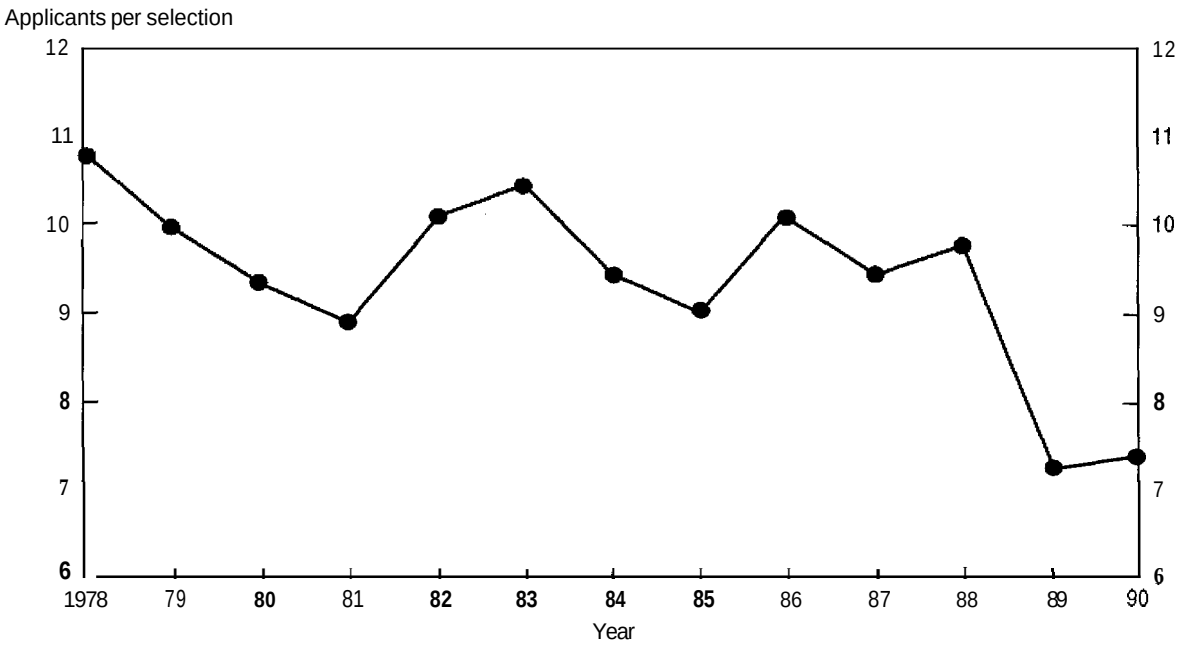


Figure 7. Applicants per selected worker
General schedule, FY 1978-1990



Source: Data provided by U.S. Office of Personnel Management.

wages. Figure 7 shows that the number of applications per white collar job openining in the federal government fell from above 10 in 1978 to about 7 in 1990. Of course, these raw application figures do not reflect possible changes in the quality of applicants for federal jobs.

Many economists have found that quit rates are strongly related to wages. To explore the relationship between quit rates and education levels in the federal government, we divided agencies into those with a high average level of education and those with a low average level of education. Quit rates for these agencies in selected years are shown in Table 6. Between 1978 and 1992, the quit rate declined for both groups of agencies. Because relative compensation became more generous for federal workers with a low level of education in the 1980s, it is surprising that we do find the quit rate falling more for agencies with a low average level of education than for those with a high average level of education. This puzzling finding may result because the agency level is too crude to measure these kinds of relationships, or because agencies were able to manipulate nonwage compensation to retain highly educated workers.

Table 6. Average quit rate in federal agencies by 1988 mean education

Agency	Mean Educ.	Prop. H.S. Degree	Prop. College Degree	Monthly Quit Rate			
				1992	1990	1981	1979
Lowest 5 on Average Education							
GPO	12.94	0.53	0.19	0.03	0.14	0.31	0.20
Gen. Serv. Adm.	12.95	0.46	0.22	0.16	0.30	0.68	0.64
Transportation	13.68	0.41	0.28	0.49	0.74	0.47	0.59
Defense	13.89	0.39	0.36	0.17	0.31	0.39	0.35
Smithsonian	13.90	0.41	0.36	0.33	0.40	0.43	0.45
Mean	13.47	0.44	0.28	0.24	0.38	0.46	0.45
Highest 5 on Average Education							
Nuclear Reg.	15.72	0.23	0.70	0.31	0.30	1.14	0.81
NLRB	15.85	0.27	0.62	0.23	0.31	0.48	0.78
GAO	15.86	0.15	0.76	0.22	0.35	0.51	0.53
EPA	15.86	0.16	0.69	0.24	0.42	0.69	0.70
U.S. AID	16.16	0.20	0.71	0.14	0.35	0.38	0.16
Mean	15.89	0.20	0.69	0.23	0.35	0.64	0.60

Notes:

Quit rate **is** the average monthly **quit** rate for the first quarter of each year.
Agency-level **quit** rates are derived from "Federal Civilian Workforce Statistics: Employment and Trends," Office of Personnel Management, Washington, **D.C.,** various issues.
Mean education, proportion with high school degree, and proportion with college degree are authors' calculations from Central Personnel Data File for 1988.

Conclusions and suggested policy reforms

We reach five main conclusions:

1. The wage structure of private sector workers in the United States and several other countries has changed dramatically in the last decade or so. **The** gap in pay between less educated and more educated **workers** expanded considerably. Even within education

groups, the dispersion in wages increased. In the United States, less educated workers experienced a significant decline in real earnings; over 20 per cent decline for young high school graduates.

2. The wage structure for government workers has not changed nearly as much as that for private sector workers. In particular, less educated workers experienced only a modest decline in real earnings. As a result, the government wage structure **is** now more compressed relative to the private sector **than** in the past.

3. In contrast to pay structure inflexibility, the average ***level*** of state and local government workers' wages is responsive to budget considerations. Pay in the state and local government sector is about as sensitive to changes in the state unemployment rate **as is** pay in the private sector. Federal government workers' pay is rigid in the face of changing local economic conditions, however.

4. Government pay scale compression affects the government's ability to recruit and retain qualified workers. Government employment is less cyclical than private sector employment, and possibly even countercyclical.

5. No single explanation appears to account for government pay inflexibility. Political pressures make it difficult to increase **pay** at the top end of the distribution. Bureaucracy, political pressure, and the government's unique mission probably all contribute to inflexibility at the bottom of the distribution.

Policy reforms

The level of centralization of wage setting in the United States is related to government pay flexibility. Wage setting in the federal government is more centralized than in the state and local government sector, and federal wages are much less responsive to local labor market conditions. Pay in the federal government does not vary much across regions, and wage increases have been fairly uniform for workers with different skill levels. The Federal Employees Pay Comparability Act **(FEPCA;** 5 USC 5301) of 1990 was designed to increase pay flexibility. Although the **Act** has not taken full effect yet, it is likely to enhance regional pay flexibility by setting region-specific wage rates.

Briefly, FEPCA requires that annual salary increase for ***GS*** workers be based on changes in the BLS's national Employment Cost Index (ECI). In addition, by 1994 FEPCA will greatly expand the Bureau of Labor Statistics' (BLS) employer surveys to estimate average federal and nonfederal pay by locality. Based on these surveys, a nine-member panel will make recommendations for locality pay to the President's Pay Agent. The Pay Agent then makes final recommendations to the President. According to the Act, federal employees in high-wage areas are to receive larger pay raises, gradually eliminating the federal-nonfederal pay gap. Federal employees who are not in high-wage areas will receive pay raises based on the ECI. The government has until 2004 to fully phase in locality pay and eliminate pay gaps between federal and nonfederal white collar workers.

There are several potential problems with FEPCA that need to be monitored closely as the Act takes effect. First, the BLS's survey of Professional, Administrative, Technical and Clerical (PATC) jobs, which together with the BLS Area Wage surveys, will form the basis for locality adjustments, yields results that are wildly inconsistent with other surveys, such as the Current Population Survey and the decennial Censuses. For example, in 1991 the PATC survey found that pay of white collar jobs in the federal government trailed comparable private sector jobs by **22** per cent to **39** per cent, whereas our CPS results for 1991 indicate that the average college graduate earns more in the Federal government than in the private sector ***(see*** Table 1)[23].

Second, expanding the geographic coverage of the establishment-based surveys will be expensive, and only partial funding has so far been provided. The BLS estimates that an additional $15.8 million is required for the PATC survey, which would be the largest one-year increase for a single data program in the history of the **BLS** (BNA 1991b). Given the past criticism of the PATC survey, one must wonder if this additional expenditure **is** justified.

Third, FEPCA plans to use many small geographic areas for locality adjustments. Estimates for larger regional adjustments would be more precise, and would certainly be an improvement over the current nationwide pay scale. For example, geographic pay differentials could be set on a state or regional level, with further adjustments for size **of** metropolitan areas within states or regions. Furthermore, if broader regions were used to define geographic zones, existing household surveys such as the Current Population Survey or Census easily could be used to estimate average pay for nonfederal workers with comparable characteristics instead of establishment-based surveys, with no extra cost.

Fourth, for most ***GS*** workers, raises will be based on the increase in the ECI. This practice will cause inflexibility because nonfederal wage growth in some regions will be below the average. Furthermore, increasing the entire **GS** wage scale at a constant rate will cause inflexibility across skill groups. FEPCA has some provisions to address wage structure compression, but it remains to be seen how effectively these provisions will be implemented. Another source of rigidity unaffected by FEPCA **is** that pay raises for blue collar workers have been capped at the GS level since 1978. If the external labor market for blue collar workers improves, this practice may prevent the federal government from paying competitive wages.

Fifth, the pay agent's recommendations have been ignored in the past, and one would suspect that the President would **be** inclined to ignore them in the future if an alternate plan were politically expedient. FEPCA allows the President to submit an alternative **pay** plan in the event of a "national emergency or serious economic conditions."

In state and local governments, arbitration is used for a growing number of workers to determine wages and working conditions. Arbitration is an attractive alternative because it helps shield the pay-setting process from political pressures. However, arbitrators typically compare government workers in one jurisdiction to government workers performing the same function in another jurisdiction to determine awards (see Olson and Jarley, 1991). Obviously, the government wage structure will not respond to private sector developments if other government workers are the point of reference used to adjust pay.

There is nothing inherent in arbitration that leads to pay structure inflexibility. To facilitate adjustment to changing private sector wage structures, arbitrators could be encouraged to consider the wages of comparable private sector workers in setting public sector workers' pay. We suspect that one criticism of this approach will be that it is hard to identify private sector workers who perform comparable work. But in many occupations the comparisons are readily apparent. For example, public sector bus drivers could be compared to nearby private sector bus drivers, government sanitation workers could be compared to private sector sanitation workers, etc. In more ambiguous cases, such as police and fire, there are a variety of ways that comparable private sector workers could be identified. For example, the arbitrator could identify the occupations and industries that current government workers and job seekers come from. Likewise, the jobs that employees take when they leave government employment could provide guidance in identifying comparable jobs. Additionally, arbitrators could develop a profile of the training (e.g.. years of education) and responsibilities that are required for specific government jobs, and base the comparison group on private sector workers with a similar level of training and responsibilities.

Finally, we note that basing public sector pay exclusively on a comparison between public and private sector wages is not necessarily the most economical approach. Working conditions and fringe benefits are different in the public and private sectors, and they vary across departments in the public sector. Public-private wage comparisons typically do not take account of nonwage aspects of employment. Clearly, fringe benefits and working conditions are important components of compensation. In addition to wage and fringe benefit comparisons, governments could rely on essential labor market indicators, such as the turnover rate and application rate, to set government workers' pay. These indicators reflect the relative attractiveness of both wage and nonwage aspects of government employment, and also reflect different economic conditions across localities and skill groups.

Technical Appendix

To adjust for compositional changes in the work force, we used various years of the Full Year Outgoing Rotation Group (ORG) files of the CPS, available since 1979, and the May 1973 and May 1975 CPS to estimate a series of wage regressions.[24] These data sets indicate in which branch of government a worker is currently employed, and contain usual weekly earnings and usual weekly hours on the current job.

The hourly wage rate is derived as the usual weekly wage divided by usual weekly hours.[25] Wages each year were converted to 1991 dollars using the personal consumption expenditures (PCE) implicit price deflator for GNP, One limitation of the CPS is that prior to 1991 the edited version of the usual weekly earnings variable is top-coded at $999 in current dollars. The unedited usual weekly earnings variable is top-coded at $1999, but this field is only available for the ORG sample after 1985. The following procedure was used to overcome this censoring problem. First, we calculated the mean log hourly wage rate of those in 1988 who had top-coded edited usual weekly earnings using the unedited weekly earnings variable. This figure was then assigned to each individual in the 1988 CPS whose edited weekly wage was top-coded. If few people are censored by the $1999 earnings limit on the unedited field, this procedure will lead the expected value of the error in the regressions to be approximately zero. For 1979 and 1983 ORG samples, we converted the top-coded amount into 1988 dollars and used the distribution of the unedited weekly earnings variable from 1988 to extrapolate the mean log hourly wage rate in 1988 dollars of these 1979 and 1983 top-coded earners. Since less than 0.2% of workers are top-coded prior to the late 1970s, we ignored top-coding in our May 1973 and May 1975 CPS samples. In 1991, no adjustment was made for top-coding because the edited weekly wage was top-coded at $1,999.

We divided the sample into eight subsamples by gender, experience (0-19 and 20+ years), and education (12 and 16 or more years of schooling) for both the private and public sectors. For each subsample, we estimated ordinary least squares wage equations of the form:

$$\ln W_{ijt} = \alpha_{jt} + \beta_{jt} X_{ijt} + \varepsilon_{ijt}$$

where $\ln W_{ijt}$ is the natural logarithm of the hourly wage rate, X_{ijt} is a vector of personal characteristics (education, two race dummies, an experience spline, standard metropolitan statistical area (SMSA), and part-time status), β_{jt} is a vector of coefficients, and ε_{ijt} is assumed to be a homoskedastic error term with mean zero.[26] The subscript i refers to individuals, j indicates the sector of employment (public or private), and t is the year. Thus, the earnings equation was estimated separately for private sector workers, all public sector workers, federal government workers, and state and local government workers, and for each year. Self-employed workers were excluded from the samples.

The predicted wage rate each year for the four sectors (private, public, federal, state and local) was calculated by gender-experience-education group for a hypothetical worker with the following characteristics: white, full time, resident in a metropolitan area, and each of two selected experience levels. That is, we formed the predicted wage with the approximation:

$$\hat{W}_{jt} = \exp\,[\hat{\alpha}_{jt} + \hat{\beta}_{jt}X^0]$$

where X^0 is the vector of characteristics of the hypothetical worker. The estimated average wages are reported in Table 1. This approach standardizes the wage comparisons for differences in worker characteristics between sectors at a point in time, and for compositional changes within each sector over time.

Notes

1. We are grateful to Matt Downer and David Lee for excellent research assistance in preparing this paper.

2. See Smith (1977) for a more detailed discussion of wage-setting practices in the government.

3. Executive order 10988 issued by President Kennedy in 1962 legalized collective bargaining in the federal government, providing federal workers with the rights to join unions and bargain over working conditions, but not to bargain over wages.

4. In 1991, 8% locality pay increases were implemented for GS workers in the New York City, Los Angeles, and San Francisco metropolitan areas.

5. Ehrenberg and Smith (1991, chapter 13) contains a nice discussion of trends in public sector employment in the U.S.

6. An extensive time-series analysis by Freeman (1987) also finds that government workers tend to lose ground to private sector workers in times of high inflation.

7. Specifically, the reported wage corresponds to a white, full-time worker who lives in a metropolitan area. The methodology used to compute the table follows Katz and Krueger (1991). The years 1973 and 1975 were pooled together to increase the sample size.

8. Our discussion focuses mainly on low-experience workers because changes in the wage structure tend to occur more rapidly for recent labor market entrants, and because low-experience workers are more mobile and therefore more representative of the external labor market.

9. This finding has been documented by several researchers. For examples, see Levy (1989), Blackburn, Bloom, and Freeman (1990), Murphy and Welch (1992), and Katz and Murphy (1992).

10. The figures also adjust for several individual characteristics that are expected to influence earnings, including years of work experience, residence in a city, and race. The graphs are based on CPS data. See Katz and Krueger (1991) for a more detailed description of the methodology.

11. In spite of intense public debate, salaries of Senators increased to $99,400 in 1990 and $101,900 in 1991, and salaries of Congressmen increased to $96,600 in 1990 and $125,100 in 1991. Supreme Court Justices salaries increased to $118,600 in 1990 and $153,600 in 1991.

12. Johnson and Libecap (1989), however, find that wage growth across federal agencies is unrelated to agencies' employment growth between 1980 and 1985, other things being equal.

13. To adjust for differences in workforce composition, each year we estimated log hourly wage regressions for workers from 18 to **64** years old. The regressions included the following control variables: four dummy variables for level of education; a quartic in experience; dummy variables for race, gender, marital stats, and metropolitan area; and each of these control variables was interacted with gender. We then calculated the mean wage residuals in each state and year for workers by sector.

14. Each observation in the regressions is given a weight proportional to the average employment in 1979 and 1989 in the state-sector cell.

15. See Bureau of National Affairs (1991a).

16. This section is based in large part on Katz and Krueger (1991), which contains a more detailed description of the underlying evidence.

17. The Task Force Reports of the National Commission on the Public Service (1989) document several instances of voter resentment toward public sector employees, which probably is responsible for much of the opposition to government pay increases.

18. Uniform wage increases have not been the case in private sector firms (see Groshen, 1990).

19. See Katz and Murphy (1992), Murphy **and** Welch (1991), Bound and Johnson (1992), Mincer (1991) and Krueger (1992).

20. ***See*** Abraham and Hausman (1992) for evidence on wage structure stability in West Germany.

21. This example refers to Plainsboro, N.J., and was reported in ***The Trenton Times,*** May 12, 1992. Of course, the economic downturn may also have contributed to the long list of job applicants. Krueger (1988a) presents evidence showing that the number of applications for federal jobs is responsive to the federal-private wage differential, other things being equal.

22. We calculated mean education in the federal government by occupation and state from micro data from the Office of Personnel Management's Central Personnel Data File for 1986 and 1988. We calculated the average education of private sector workers in a state from the 1986 and 1988 CPSs. **We** calculated state-specific wage differentials for private sector workers from the CPS for 1986 and 1988, using a regression model to adjust for differences in individual characteristics (e.g., education and experience).

23. In contrast to the PATC survey, Smith (1977), Quinn (1979), Venti (1987), Krueger (1988b), and Moulton (1990) find that, on average, federal workers are paid more than private sector workers, holding individual characteristics constant.

24. Each May CPS from 1973 to 1978 contains about one-third as many observations as the Full Year ORG files, available since 1979. We pooled the May 1973 and 1975 CPSs together to provide a larger sample of data. The May 1974 tape that we were able to access lacked information on level of government and was not used.

25. We eliminated from the sample individuals who earned less than $1.67 per hour or more than $150.00 per hour, in 1988 dollars.

26. Actual work experience is not contained in the data set. As is standard practice, we defined experience as [(age) - (years of education) - 6]. Furthermore, we specified the experience effect as a spline function with two terms for each of our subsamples, with a break point in the spline function occurring at 10 years for the 0-20 years of experience group and 30 years for the over 20 years of experience group.

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