

**The Decentralization of Collective Bargaining and
Changes in the Compensation Structure in Israel's Public Sector**

Zvi Sussman* and Dan Zakai**

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* Eitan Berglas School of Economics, Tel-Aviv University.

** Research Department, Bank of Israel.

ABSTRACT

From the beginning of the 1970s until the recent round of negotiations in 1993, the process of wage determination in Israel's public sector underwent two major changes: (a) There was a gradual shift from centrally determined uniform wage increases in collective agreements with professional unions to independently negotiated increases in each agreement. (b) Policies involving strict wage restraint were introduced by the collective agreements. These changes in the process of wage determination affected the structure of wages in Israel's public sector in two distinct ways: First, there was greater differentiation between the basic wages of professional groups as determined by the collective agreements. Second, in response to small wage increases from collective agreements which would have led to a considerable erosion of real wages, the determination of wages at lower levels of negotiations increased in importance. At these levels, mechanisms meant to circumvent the restraint imposed by the collective agreements expanded rapidly. The main mechanisms were wage supplements paid to particular groups of employees or individuals, and accelerated promotion. These mechanisms soon became as important as the collective agreements in determining public sector wages. Low-level and less formal negotiations increased wage dispersion among different professions, and between employees performing similar tasks within each profession. Initially, the increase in dispersion might have contributed to a more flexible wage structure, through greater responsiveness to market forces as well as to individual motivation and performance. These mechanisms gradually lost their advantage as an instrument for rewarding a few employees at a low cost, and spread indiscriminately among more employees with rising outlays. More important, wage differentials grew until they were no longer functional and even became detrimental to labor relations and output.

The paper describes the growth of the mechanisms which partly replaced collective agreements in determining wages, quantifies their effect on the growth of total wages and wage dispersion, and attempts to assess the damage caused to the public sector by these mechanisms, and by excessive dispersion, in particular. Underlying the analysis of wage dispersion is an *ad hoc* model of wage determination in the public sector which focuses on the concept of an internal labor market and the negative relation between centralized wage determination and dispersion.

The Decentralization of Collective Bargaining and Changes in the Compensation Structure in Israel's Public Sector^{***}

1. INTRODUCTION

From the beginning of the 1970s until the recent round of negotiations in 1993, the process of wage determination in Israel's public sector underwent two major changes: (a) There was a gradual shift from centrally determining uniform wage increases in collective agreements with professional unions to independently negotiated increases in each collective agreement. (b) Policies involving strict wage restraint were introduced by the collective agreements. These changes in the process of wage determination affected the structure of wages in Israel's public sector in two distinct ways: First, there was greater differentiation between the basic wages of professional groups as determined by the collective agreements. Second, in response to small wage increases from collective agreements which would have led to a considerable erosion of real wages, the determination of wages at lower levels of negotiations increased in importance. At these levels, mechanisms meant to circumvent the restraint imposed by the collective agreements expanded rapidly. The main mechanisms were wage supplements paid to particular groups of employees or individuals, and accelerated promotion. These mechanisms soon became as important as the collective agreements in determining public sector wages. Low-level and less formal negotiations increased wage dispersion among different professions, and between employees performing similar tasks within each profession. Initially, the increase in dispersion might have contributed to a more flexible wage structure, through greater responsiveness to market forces as well as to individual motivation and performance (OECD, 1993). These mechanisms gradually lost their advantage as an instrument for rewarding a few

^{*} School of Economics, Tel-Aviv University.

^{**} Bank of Israel, Research Department.

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employees at a low cost, and spread indiscriminately among more employees with rising outlays. More important, wage differentials grew until they were no longer functional and even became detrimental to labor relations and output.

The purpose of this paper is to describe the growth of the mechanisms which partly replaced collective agreements in determining wages, to quantify their effect on the growth of total wages and wage dispersion, and to assess the damage caused to the public sector by these mechanisms, and by excessive dispersion, in particular. Underlying our analysis of wage dispersion is an *ad hoc* model of wage determination in the public sector which focuses on four main aspects:

A. The concept of an internal labor market

Public sector employees remain in the same place of work for a long time. After an initial trial and error period, labor mobility into and out of the sector is low and is not greatly affected by fluctuations in wages. Thus, most employees are in careers which might extend throughout their entire working life. In addition, the typical public sector employer is not guided by profit considerations. The short-term impact of market forces on wages in the sector is therefore rather limited. Large deviations of wages from what could be regarded as the equilibrium wage i.e., wages determined by a human capital model, might be quite common and prevail for extended periods (for a recent contribution on internal labor markets in the business sector, see Baker, Gibbs, Holmstrom, 1994a and 1994b).

B. The negative relation between centralized wage determination and dispersion

Several studies have attempted to measure the centralization of wage determination (Calmfors, 1993). Centralized bargaining tends to reduce the effect of local places of work on relative wages that are not warranted by differences in human capital. One explanation could be the high costs of *deviation* from the norm for a small local union. Although there are exceptions (e.g., Austria), Rowthorn (1992) found that in 17 developed countries the greater the centralization of wage bargaining, the lower the wage dispersion (see Holmlund and Zetterberg, 1991; Rowthorn, 1992).

C. Decentralized wage determination generating wage dispersion not warranted by market forces

Decentralized bargaining at local levels or between different professional groups or even individuals will give rise to substantial wage dispersion. At first, the increase in differentials might reflect policies aimed at making wage determination more flexible and enhancing productivity (OECD, 1993; Barth and Zweimuller, 1995). However, the differentials could eventually become excessive by not being related to human capital or effort, i.e., they are non-functional. Differentials with no functional justification are a consequence of some form of "insider power", not strictly dependent on lower level union power, but no doubt enhanced by it (Ramaswamy and Rowthorn, 1993). Excessive wage dispersion can also arise because firms have some degree of monopoly power and can obtain workers by paying less or can afford to pay more than the market clearing wage. The power of these firms is not only a result of imperfect information with regard to wage offers but also creates such imperfections.

Excessive dispersion will exist as long as ignorance (Stiglitz, 1985) or secrecy (Pfeffer and Davis-Blake, 1990) regarding remuneration persists.

D. Excessive wage dispersion having a negative effect on motivation, performance, and labor relations

Excessive wage dispersion will generate Pareto inefficiencies, such as excessive search and labor mobility (at initial stages of the career), (see Stiglitz, 1985; Ramaswamy and Rowthorn, 1994). It will also increase uncertainty with regard to future wages, causing continuous bargaining and labor unrest. Excessive dispersion will intensify wage comparisons, which will spread throughout the public sector and lead to spillover effects which do not reflect market forces in the labor market (Artstein and Sussman, 1993; Gotlibovsky and Schwartz, 1994). Finally, public sector employees may regard excessive dispersion as unfair, in which case productivity will be affected (Akerloff and Yellen, 1990).

It is not our intention to subject these hypotheses to any formal tests. Nor do we regard them as a complete model for determining the wages of public sector employees. The reader should beware of an overly simplistic interpretation of causality, going from restraint to decentralization, and hence to excessive wage dispersion. During the period under review, other forces affected the structure of labor relations and wage dispersion in Israel. The influence of institutional labor relations declined and the General Federation of Labor (the Histadrut) became less influential in the business sector as well. The government encouraged these developments, seeking to increase the exposure of wage determination to market forces and enhance wage flexibility. Decentralization was promoted without paying due regard to the macroeconomic consequences of moving the focus of wage determination from the center to industry and professional unions (Calmfors, 1993; Sussman 1995). However, it is our belief that in the public sector, wage restraint accelerated this process, which would otherwise have evolved more slowly. Also the causal connection between multi-level wage determination and wage dispersion is not always obvious. Wage restraint was applied in the public sector for short spells between the 1950s and the early 1970s, causing wage drift but with far less effect on dispersion. As the Swedish experience shows, the *norms* for an equitable centrally-determined distribution of wages are not always violated by local wage decisions, even if there are substantial adjustments at the firm level (Edin and Zetterberg, 1992).

The paper proceeds as follows: The second section describes the institutional framework for the determination of wages and the changes it has undergone. The third section describes the policy of wage restraint. The fourth section attempts to estimate the importance of collective agreements, promotions, and wage supplements in determining total wages. Section Five analyzes measures of wage dispersion between and within different professions, and the contribution of collective agreements to this. Section Six considers whether on the basis of the available data it is possible to distinguish between efficient and nonfunctional wage differentials. The last section contains our views on the damage caused by the expansion of the adjustment mechanisms beyond their intended purposes.

2. THE INSTITUTIONAL FRAMEWORK OF WAGE DETERMINATION

Although the role played by different levels of wage determination in the public sector has changed, its basic features have remained intact since the establishment of the State in 1948. The system can be characterized as multi-level bargaining where negotiations over different wage components are conducted at each level. A schematic overview of the system is presented in Table 1.

At the highest level, biennial economy-wide *guidelines* are the result of negotiations between the *Histadrut* and the employers' association, usually with the informal participation of the government. Within the public sector, these guidelines stipulate across the board wage increases for the coming two years. These guidelines were incorporated (for most of the period) into a biennial *framework* agreement negotiated by representatives of the *Histadrut*, with unions and employers in the public sector. The framework agreement is then translated into collective agreements negotiated at a lower level of industry or professional unions and the respective employers' representatives.

In addition to the framework agreement, a countrywide cost of living (CoL) agreement covers the procedure for adjusting wages to changes in consumer prices throughout the designated period. Since indexation is only partial, the expected increase in prices has to be taken into account when determining the basic wage increases in the guidelines and the framework agreement.

Most public sector employees are members of the *Histadrut* and belong to occupational unions which operate in that sector. Representing employees such as teachers, engineers, physicians, and clerks, these unions negotiate for collective agreements in which wage rates are determined in pay scales for each profession. In 1990, there were 46 pay scales in the public sector with 94 percent of the employees in the 16 major pay scales and 6 percent in the remaining 30. Some collective agreements negotiated in the public sector also cover the basic wages of professionals in the business sector. Many of the pay scales incorporate several grades, which define the basic pay of an individual employee and his position in the hierarchy of the profession or unit.

As stated, throughout the period under review the effect of the framework agreement on uniform wage-increases in the different collective agreements became less pronounced. However, the framework still exercised a certain amount of restraint on bargaining at the level of the professional union. The importance of the countrywide CoL agreement was maintained throughout the period of high inflation, but has declined since the economic stabilization program (ESP) of 1985.

The lowest level of institutional wage determination in the public sector is the equivalent of the level of the firm in the business sector. In government ministries, public institutions, local authorities, and other administrative units, local staff committees negotiate with lower level management for wage supplements, promotions, or improvements in work conditions beyond those obtained in collective agreements. The negotiations are usually less formal and do not result in additional written agreements. Activity at this level has increased greatly since 1974, resulting in

a multitude of supplements, some on an individual basis and others allocated to large groups of employees. Widespread use of promotion as a substitute for increasing the basic wage by collective agreement also occurred at this level. Towards the end of the period, the resort to individual contracts for high ranking employees also became more widespread.

TABLE 1
Wage Determination in the Public Sector

Level of negotiation	Wage components			Social benefits
	Basic wage**	CoL allowance	Promotion	
Countrywide (Guidelines)	X	X		
Sectoral (Public sector framework)	X			X
Professional unions (Collective agreement)	X			X
Autonomous units ("Firm" agreement, informal negotiations)			X	X

** Until 1987, a minimum wage allowance was paid to employees whose basic wage was below a minimum determined periodically by a special collective agreement. Since 1987, the minimum wage is determined by law.

** Includes general supplements granted to all employees of a profession.

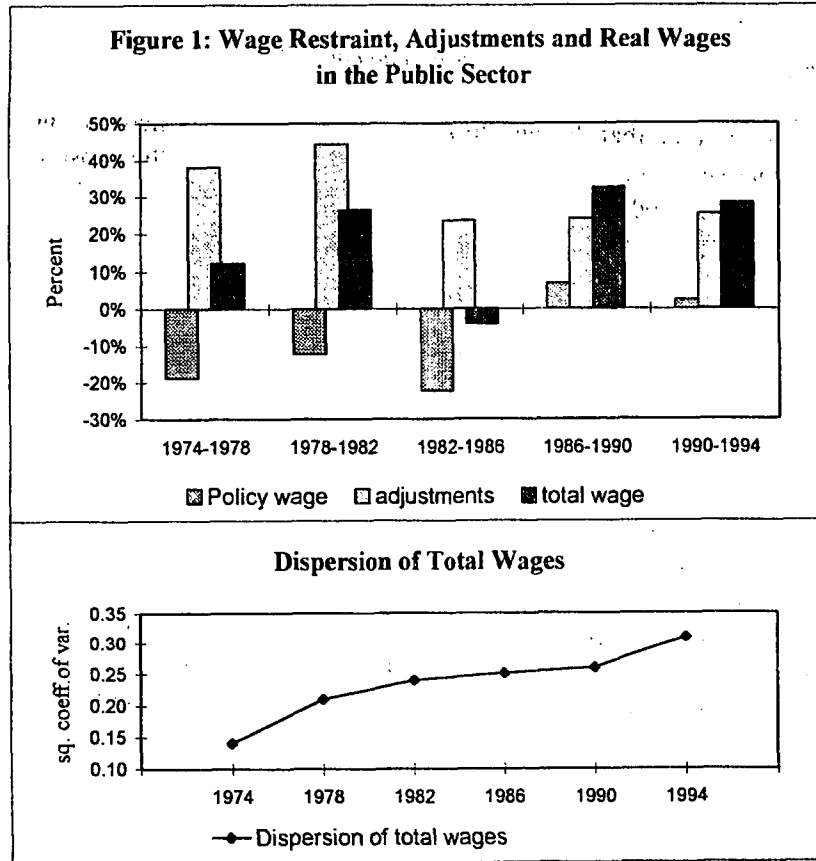
3. WAGE RESTRAINT IN THE PUBLIC SECTOR

In Israel, there is a tradition of government interference with the wage determination process in an attempt to prevent excessive wage increases. This interference has focused on the biennial framework and its translation into collective agreements. With regard to wages in the business sector, government intervention has generally been informal. At times, it was through the Labor Party (when it had the majority in the government and the Histadrut) and at others by means of package deals, where the government traded tax concessions for wage restraint in both the framework and the collective agreements. In the public sector, intervention was achieved through the government's role as employer and its control of the budget.

Until 1972, the government's main concern was to keep increases in wages uniform and in line with the expected average increase in productivity. With the onset of two-digit inflation, the outbreak of the energy crisis, and the eruption of the Yom Kippur War at the end of 1973, the objectives of wage policy broadened. From having a passive role in preventing cost pushes from the labor market, wage policy became an instrument for achieving wider macroeconomic goals. Wage restraint focused on reducing real wages and retarding the increase in nominal wages. The reduction of real wages would contain private consumption and relieve the pressure on the balance of payments. Nominal wage restraint would mitigate the cost pushes caused by increases in the price of oil and other imports as well as by frequent devaluations. Restraint was to be achieved by reducing the price-indexation of wages and moderating the increases in the basic wage within the framework and collective agreements, thereby slowing the price-wage spiral which was detrimental to the stabilization of the economy (Artstein and Sussman, 1989).

Wage restraint was applied more forcefully in the public than in the business sector, for a number of (sometimes conflicting) reasons:

- A. The large size of the public sector in Israel, which employs 30 percent of the civilian labor force, compared with the much smaller share in OECD countries (OECD, 1994). This enhanced the budgetary implications of wage increases in that sector.
- B. Wage restraint in the public sector was thought to retard wage increases in the business sector (for an analysis of intersectoral wage spillovers in Israel, see Artstein and Sussman, 1992; Elkayam, 1989; Schwartz and Gotlibovski, 1994).
- C. Lower public sector wages were supposed to stimulate the flow of labor from the public to the business sector, and to export industries, in particular. (see National Budget for 1976).
- D. The government can enforce wage restraint more efficiently with regard to its own employees (Artstein and Sussman, 1990).



As Figure 1 shows, initially the real decline in wages under collective agreements was quite large. This was because the wage increases reached under the agreements were lower than actual inflation, resulting in the considerable erosion of real wages. Given the existence of multi-level bargaining, however, wage increases due to mass promotion and supplements negotiated at the level of autonomous units or individuals could not be easily subjected to policies of restraint. The result was that wage drift prevented the decline of real wages in the public sector, and even increased them. Towards the end of the period, the policy of wage restraint determined under collective agreements was relaxed.

There are various explanations as to why the government agreed to adjustment mechanisms that defied the policy of restraint and increased wages to an unprecedented degree. One is that it believed that the combination of sustained attempts to erode real wages through collective agreements and a certain amount of compensating wage drift would result in lower real wages, at least in the short run, as well as slowing the price-wage spiral. In particular, the widespread practice of wage linkage in the public sector, and the fact that this was usually related to collective agreements, made it tempting to channel the wage increases granted certain groups towards less conspicuous and formal components. Secrecy would render comparisons more difficult and prevent or at least retard the spread of the compensating adjustments, thereby also furthering wage dispersion. The complexity of the adjustment mechanism, and attempts to conceal the wage increases granted through them led to frequent underestimates of their ex-post costs.

It is also quite likely that during the period of accelerating inflation, the expected rate of price increases was constantly under-estimated, so that the erosion of wages was higher than intended. This is consistent with findings that as inflation in Israel increased, its prediction became more difficult, even for short periods (Unger and Zilberfarb, 1993). Moreover, the relation between the rate of inflation and forecasting error has been found to be more significant with a longer forecasting horizon.^{*} The effect of error in predicting inflation on the determination of wages two years in advance might have been reduced by either fully indexing wages to actual prices or by renegotiating wages during the term of the original collective agreements. Neither of these alternatives was adopted, however. It was thought that full indexation would accelerate inflation further, particularly in an economy subject to frequent supply shocks, and that the reopening of agreements would lead to protracted bargaining, with the high negotiation costs common to the public sector in Israel.^{**}

The government tried to prevent the spread of promotions and wage supplements in two ways. One was to appoint several public commissions charged with proposing ways of attaining a more uniform and centrally-determined wage structure, including the suspension of supplements. Another was to increase its control of remuneration in all organizations funded by the government. Occasionally it resorted to the courts in an attempt to annul excessive wage increases by public sector corporations and non-profit organizations, but this was not strictly enforced.

Whatever the reasons for the strict restraint of wages in collective agreements, it appears that the government did not adequately assess the full potential for the expansion of the adjustment mechanisms and the damage to be expected from their growth. The contribution of these adjustment mechanisms to total wages and wage dispersion will be analyzed in the next two sections.

4. THE DECLINE OF COLLECTIVE AGREEMENTS, AND THE RISE OF PROMOTION AND SUPPLEMENTS

Wages in the public sector can be determined by different pay systems. A system can be rigid, with emphasis on rank within the hierarchy, as determined by rules and procedures. Alternatively, the pay system can be based on incentives and efficiency. Finally, it can respond to demand and supply for similar categories of human capital (OECD, 1994).^{***} We presume that in the very long run, wages in the public sector will be determined by fundamental economic forces. In the shorter term, however, wages will also be affected by the characteristics of the particular adjustment mechanism - agreed wage rates, supplements, and promotions - which will affect wage flexibility in different ways. Thus, the resulting changes in wage dispersion will reflect the particular effect of each adjustment mechanism on wage dispersion, and the

^{*} Melnick (1993) expresses the view that the rapid acceleration of inflation in the late 1970s was unexpected and took policymakers by surprise.

^{**} With the increase in inflation, indexation of wages was increased, but not to the full extent.

^{***} An additional adjustment mechanism is change in the legal and administrative structure of the public sector, and in particular the relative size of the central government. We have not dealt with this aspect in the present paper.

importance of each mechanism in determining total wages.* In what follows, we will test whether, during the period reviewed, a large number of supplements and extensive resort to promotion had a distinct effect on wage differentials both increasing them and causing wages to fluctuate.

The proliferation of supplements was reflected first and foremost in the pay slip of a typical employee. This included a long list of supplements, such as car and clothing allowances, overtime, payment for standby duty, etc., some of them paid on a monthly basis and others less frequently. Almost all the supplements were unrelated to actual activities or expenditure, such as travel requirements on the job, actual time worked, and so on. The growing importance of promotion as a wage adjustment mechanism was reflected by the increase in the percentage of employees promoted each year, raising the proportion of them concentrated at the top. The promotion of an individual employee to a higher grade was connected only loosely to his or her performance or to the new job. Promotion would add an amount to the wage which depended on the wage rates at the higher grade, but also on what supplements were attached to it. As the adjustment mechanisms increased in importance, it became more difficult for the employee to assess his relative wage at a given point in time and the expected increase in his real wage over time, in response to greater effort, more experience, or additional investment in human capital. Since it was difficult to ascertain the effect of promotion or supplements on actual wages, the employee was left with little knowledge of the expected increase on his wages during the period covered by the collective agreement (usually two years).

Table 2 summarizes the main developments described so far, showing the increasing importance of the adjustment of wages at lower levels of negotiation, and the individual wage supplements and promotion, in particular. At the same time, the biennial negotiations regarding collective wage-agreements for professions or large segments of the public sector, declined in importance. As adjustments at lower levels increased, so did wage dispersion. Initially, greater dispersion could have increased flexibility in granting wage raises on the basis of individual or group performance, but we presume that with the rise in wage spread, differentials became less functional and there was a concomitant increase in the cost of relying on these mechanisms for maintaining real wages. These points will be further developed in the next section.

* Although a compensation contract optimizes *total* incentives, for an employee near retirement, career concerns (promotions) are weaker and explicit incentives (supplements) stronger. The opposite should be true for young workers (Gibbons and Murphy, 1992). This could affect the different emphasis on promotion and supplements for different age groups.

TABLE 2
Supplements, Promotions and Wage Dispersion
in the Public Sector, 1974-1994*

Period (April)	Supplements in total wages (percent)	Employees promoted** (percent)	Dispersion of total wages (sq. coeff. of var.)
1970		17	
1974	23	37	0.14
1978	36	48	0.21
1982	43	43	0.24
1986***	45	33	0.25
1990	50	50	0.26
1994	54	38****	0.31

* The percentage of supplements and the square coefficient of variation are chained between four-year constantly employed persons for four-year periods.

** Annual average percentage for the four years preceding the period.

*** August.

**** Preliminary estimate.

A. The contribution of collective agreements to total wages

Collective agreements determine changes in the wage rates for each grade within the pay scales of the various professional unions. This is only the first step in the adjustment of total wages, however. Following the change in wage rates, a number of supplements, (initially a few, later many), which are defined as a percentage of wage rates, are adjusted automatically. This applies mainly to supplements for seniority but also to many others, such as those for overtime, whether actually worked or not. Moreover, the nationwide CoL agreement determines the procedure for the automatic adjustment of the wage rates to the increase in consumer prices, and this is also used to adjust several supplements. Other supplements are also adjusted periodically, either on an ad hoc basis, or in accordance with price increases on the basis of predetermined procedures.

Within the scope of this study, it has not been feasible to estimate the automatic effect of a change in the wage rates on wage supplements. However, it is our view that the parties to the negotiations bear these repercussions in mind when determining the change in wage rates. We have therefore estimated the effect of the collective agreement on total wages by applying the rate of change of the wage rates to total wages at the base period. We have called this wage thus defined "policy wage," assuming that collective agreements affect only wage rates (and not total wages). The alternative would have created a large downward bias in the effect of collective agreements on total wages.^{*} The actual calculations of the contribution of collective agreements to total wages have been made separately as described below, using the following definitions:

Total wages in period t ($t=0,1$)	= WT_t
Wage rates at zero seniority in period t ($t=0,1$)	= $TAWVZ_t$
Rate of change in wage rates	= $TAWVZ_1/TAWVZ_0$
Policy wage in period $t=1$: POW_1	= $WT_0 \times TAWVZ_1/TAWVZ_0$

The change of wage rates has been calculated for each grade j within each profession p on the basis of the actual wage rate of the n of employees at grade j in period t . The wage rate includes a seniority supplement. We regard changes in the seniority supplement as determined mainly by the increase in age of the "cohort" of constantly employed persons, although throughout the period the maximum seniority ceiling was raised a number of times. Consequently, changes in seniority are not regarded as being determined by collective agreements. Since the actual seniority of employees at grade j might alter due to changes in the distribution of employees among grades between the periods, the wage rate at grade j has been standardized for

^{*} We are aware that a more restrictive view of the effect of collective agreements, or the basic wage, on total wages has been adopted in other studies (OECD, 1994), but believe that the wider definition used here reflects the Israeli situation more accurately.

zero years' seniority in period $t=0,1$, thus enabling us to calculate the rate of change due to the agreements.

The contribution of collective agreements to the total change in wages for profession p , (CWTAp) has been calculated after aggregating for all grades j , and keeping the "basket" of employees, i.e. the base year distribution of employees among grades constant:

$$CWTAp = \frac{\sum_j POWVZ_{1j} \times n_{0j}}{\sum_j WT_{0j} \times n_{0j}}$$

B. The contribution of promotion to total wages

The contribution of promotion to the change in total wages from $t=0$ to $t=1$ has been calculated on the basis of the assumption that an employee who has been promoted between periods 0 and 1, first receives the increase in his or her wage rate before promotion, as determined under the collective agreement, and is then promoted to a higher grade and receives the (new) wage rate of his or her new grade.^{*} Since the average seniority of employees at the grade to which the employee has been promoted could be much higher than his seniority, the contribution of promotion has been calculated after standardizing the wage rate for zero years of seniority (VZ). If the number of employees at grade j in the two periods is n_0 and n_1 respectively, the contribution of promotion to the change in wages of the employees in profession p , (CPROp) is:

$$CPROp = \frac{\sum_j POWVZ_{1j} \times n_{1j}}{\sum_j POWVZ_{1j} \times n_{0j}}$$

C. The contribution of drift of supplements to total wages

Finally, the contribution of the drift of supplements for profession p , (CDSp), to the increase in total wages of the profession is derived as a residual:^{**}

^{*} We have calculated the contributions so that their product equals the change in total wages.

$$\frac{TAWVZ_1}{TAWVZ_0} = CWTAp \times CPROp$$

$$\frac{WT_1}{WT_0} = CPROp \times CWTAp \times CDSp$$

$$CDS_p = \frac{\sum_j WT_{1j} \times n_{1j}}{\sum_j WT_{0j} \times n_{0j}} / CPRO_p \times CWTAP$$

In addition to the drift of supplements, the residual includes the effect of the four-year increase in seniority of continuously employed persons.

All the calculations for profession p have been made for persons continuously employed in the profession for four-year periods. For the whole public sector, the results for all professions have been summed up and are presented in Table 3.

TABLE 3
The Contribution of Collective Agreements, Promotion, and
Supplement Drift to Total Wages (Contribution of Rate of Change), 1974-94

Period	Total*	Wage rates*	Promotion	Residual supplements drift**
1974-78	1.109	0.753	1.054	1.396
1978-82	1.230	0.819	1.208	1.244
1982-86	0.960	0.816	1.245	0.944
1986-90	1.328	0.906	1.262	1.161
1990-94	1.070	0.962	1.060	1.049

* Deflated by CPI.

** Includes the effect on wages of changes in seniority.

As the table shows, the largest erosion of real wages by wage rates determined under collective agreements occurred the first three periods (1974 to 1986). From 1986 on, wage policy restrained wages less. Furthermore, promotion and supplements contributed jointly to turning the decline in the real wage rates into an appreciable rise. Throughout the period, the contribution of promotion and supplements was similar in extent, with one mechanism compensating for shortcomings in the other, as in the first and the third sub-periods.

5. WAGE DISPERSION IN THE PUBLIC SECTOR

To a greater degree than in the business sector, wage dispersion in the public sector reflects the powerful influences of unions, employers and a variety of administrative-bureaucratic practices. At the beginning of the period, the effect of these non-market forces was to keep wage differentials in the public sector rather small.

The main force was the more centralized organization of the public sector (i.e., fewer independent organizations). Centralized wage negotiations in the public sector covered almost all its employees. Collective agreements for different professional groups were negotiated according to the uniform rates stipulated by the national guidelines or public sector framework agreement, and determined similar wage increases; the agreements covered most of the increases in wages while the adjustment mechanisms were of only marginal importance. Moreover, supplements which had expanded were occasionally re-incorporated into the basic wage rates.

A second factor explaining the small dispersion of wages in the early period was the preference of the unions and public sector employers for small gaps between the wages of employees at the bottom and at the top of a profession, as well as between different professions, possibly reflecting an egalitarian approach. Similar influences have also operated to reduce gaps in the public-sector wages between men and women, and between immigrants, from North Africa and Europe, to a lesser extent than in the business sector (Gross, 1983).

Also it is likely that difficulties in measuring output in the public sector and even more so the contribution to it of an individual employee kept wage differential rather small. Since there were no widespread procedures for assessing an individual's contribution (Public Commission, 1989), at the beginning of the period remuneration in the public sector was made more on the basis of human capital characteristics, such as education and seniority than in the business sector (Gross, 1983). Moreover, there was no need to adjust wages frequently because of the long-term attachment between public sector employees and employers.

From the beginning of the 1970s, the wage differentials started to increase (Table 2). In part, this has been attributed to rapid inflation, which reached an annual rate of 400 percent and more in 1984 and the first half of 1985 (Achdut and Bigman, 1991). Unanticipated inflation, in particular, has been found to significantly increase inequality in income-distribution (Silber and Zilberfarb, 1994). However, as Table 2 shows, the high differential persisted after inflation was stabilized in July 1985 and its annual rate reduced to less than 20 percent. Since two factors — the egalitarian ethos and the lack of connection between wages and performance — did not change

significantly, we assume that the higher wage dispersion is related to the lesser impact of the framework agreement on rates determined under collective agreements, to the decline in the importance of wage rates and to the rapid increase in the importance of the adjustment mechanisms throughout the whole period.

Below we examine the growth of differentials in the wages of public sector employees from two different viewpoints: First, at what level did differentials increase, and second, what did wage rates and the adjustment mechanisms contribute each to this.

A. Dispersion between and within professions

In order to analyze the level at which differentials grew, we concentrate on three aspects.

Differentials in the average wage of a profession

These differentials reflect such factors as the response to the supply of and demand for labor in different professions, institutional forces such as the intensity of wage linkages between professions, and less formal spillover effects in the public sector in a given period, the organizational power of the professional unions, etc.

Differentials between grades within a professional scale

These differentials reflect the premium for experience and education within each professional scale, as well as the egalitarian tendencies within the public sector.

Differentials within grades of a profession

These differentials reflect differences in human capital and productivity, in seniority and experience, and in the working conditions of employees within a grade of a profession. The differentials are also the result of the adjustment mechanisms (supplements and promotion) for wages of employees of the same grade and profession.

Total variance has been calculated at four-year intervals for employees who have been continuously employed during this period. The analysis is restricted to this group because in this way most human capital characteristics (except for a 4-year increase in seniority and a small investment in human capital) are held constant. However, the use of this procedure neutralizes the effect on variance of certain structural changes, such as replacing senior employees with outside consultants, out-sourcing low-skilled tasks to private contractors, etc.

The results for the subperiods are presented in Table 4; the procedure for the breakdown of total variance is given in Appendix A.

* In the present paper we have not dealt separately with the effect on wage differentials of changes in the legal-administrative structure of the public sector.

Table 4 shows the dispersion of wages increased at all levels, between professions, between grades within professions, and between employees within grades. This increase occurred throughout the period, although it was particularly large during the first sub-period. It is interesting to note that dispersion did not decline - even increasing slightly - after the 1985 ESP, and especially between 1990 and 1994. The increase in dispersion was most pronounced between professions, despite the extensive linkage arrangements between them anchored in collective agreements and other binding precedents. The increase in dispersion between grades within each profession was quite small compared to the increases at the other levels: 22 percent higher in 1994 than in 1974, compared with the average increase at all levels of 124 percent. The increase in dispersion between employees within grades was quite large: 76 percent. Dispersion within grades is due entirely to the dispersion of supplements, since wage rates within a grade are similar. Finally, as the table shows, in most sub-periods there is an increase in dispersion whenever there is a switch to a new group of continuously employed persons. The increase in the dispersion of all persons who are continuously employed from one sub-period to another, which is due to changes in the composition of public sector employment is 13 percent, and this holds for all employees for the whole period. This effect is particularly great within grades, and is negative for dispersion between professions.

* The effect of the change in composition has been calculated as the difference between the chained and unchained rate of change for the whole period.

TABLE 4
Wage Dispersion^{*} between Professions and Grades, and within Grades^{}**

Period	Between professions	Between grades	Within grades	All levels
1974	0.041	0.048	0.047	0.136
1978	0.090	0.051	0.069	0.210
Rate of change (%)	119.5	6.3	47.8	54.4
1978	0.100	0.067	0.075	0.243
1982	0.142	0.071	0.062	0.275
Rate of change (%)	42.01	6.0	-17.3	13.2
1982	0.146	0.078	0.069	0.293
1986	0.140	0.087	0.081	0.308
Rate of change (%)	-4.1	11.5	17.4	5.1
1986	0.143	0.092	0.080	0.315
1990	0.151	0.090	0.090	0.331
Rate of change(%)	5.6	-2.2	12.5	5.1
1990	0.115	0.087	0.079	0.281
1994	0.153	0.086	0.086	0.326
Rate of change(%)	33.0	-1.1	8.9	16.0
Rate of Change(%) - 1974-1994 ^{***}	319.8	21.5	75.8	123.9

^{*} Squared coefficient of variation.

^{**} Continuously employed for four-year periods.

^{***} Chained between sub-periods.

B. The effect of collective agreements on wage dispersion

We now proceed to separate the effect of collective agreements on wage dispersion, from that of the adjustment mechanisms. Through wage rates, the agreements will affect differentials between professions, as well as those between different grades within a profession. Through wage supplements allocated to individuals or small groups according to administrative rules and procedures, the adjustment mechanisms will affect differentials at all the levels. Promotion will affect differentials both between professions, since they have been used more in some than in others, and between grades, by changing the distribution of employees among grades.

The total effect of collective agreements on wage dispersion comprises three separate elements: (a) changes in the dispersion of wage rates in the different professional scales (the direct effects); (b) the effect of changes in wage rates on supplements defined as a percentage of them or linked automatically to them (the secondary effects); (c) the weight of wage rates and linked supplements within total wages. On the face of it, all three channels appear to determine the contribution of the collective agreements to total wage dispersion. However, we adopted a narrower definition of the effect of collective agreements on dispersion in comparison with our analysis of their effect on total wages. The extent of the secondary effect is a function of the variety of supplements, which in some cases are partly linked by different formulas to wage rates, in others not linked at all and adjusted on an ad-hoc basis. It is our view that the additional dispersion due to linkage arrangements regarding wage supplements should be attributed to the adjustment mechanisms rather than to the collective agreement. In what follows, we restrict our analysis to the effect of collective agreements on wage rates, and the contribution of this effect to total wage dispersion, attributing the residual dispersion to the adjustment mechanism. Furthermore, the weight we have assigned to collective agreements in calculating their effect on dispersion is that of wage rates at zero seniority.

In order to assess the effect of collective agreements on total wage dispersion, we have adopted a procedure similar to the one used to gauge the effect of collective agreements on the rate of change of average total wages.

First, we calculate the dispersion of wage rates in the first year of each four-year period ($t=0$), and then in the last year of each four-year period ($t=1$), at each period's base year ($t=0$) distribution of employees among professions p and grades j .

Dispersion of tariff wages at $t=0$:

$$\frac{\frac{1}{N} \sum_{pjo} (\text{TAWVZ}_{0jp_0} - \overline{\text{TAWVZ}_{0jp_0}})^2}{\overline{\text{TAWVZ}_{0jp_0}}^2}$$

Dispersion of wage rates at t=1:

$$\frac{1}{N} \sum_{p_{j_0}} \frac{(\overline{\text{TAWVZ}}_{1j_{p_0}} - \overline{\overline{\text{TAWVZ}}}_{1j_{p_0}})^2}{\overline{\text{TAWVZ}}_{1j_{p_0}}^2}$$

Second, we calculate the contribution of the dispersion of wage rates to the dispersion of total wages at t=0,1

Contribution of wage rates at t=0:

$$\frac{\frac{1}{N} \sum_{p_j} (\overline{\text{TAWVZ}}_{0j_{p_0}} - \overline{\overline{\text{TAWVZ}}}_{0j_{p_0}})^2}{\overline{\text{WT}}_0^2}$$

Contribution of wage rates at t=1:

$$\frac{\frac{1}{N} \sum_{p_{j_0}} (\overline{\text{TAWVZ}}_{1j_{p_0}} - \overline{\overline{\text{TAWVZ}}}_{1j_{p_0}})^2}{\overline{\text{WT}}_1^2}$$

The procedure is described in more detail in Appendix A. The contribution of collective agreements in each period is the difference between the contribution in period t=0 and t=1. The results of the calculations are presented in Table 5.

TABLE 5
The Contribution of Collective Agreements to the Change in Wage Dispersion*
(Contribution to Change in Coefficient of Variation)

Period	Average Total Wages	Wage Rates		
	Change in dispersion	Change in dispersion	Contribution to change in total wage dispersion	Contribution as percent of total change
1974-78	0.074	-0.014	-0.019	-25.7
1978-82	0.032	0.202	0.029	90.6
1982-86	0.015	0.013	-0.001	-6.7
1986-90	0.016	0.035	-0.006	-37.5
1990-94	0.045	0.035	-0.007	-15.6
Total** 1974-94	0.182	0.271	-0.004	-2.2

* Continuously employed for four years.

** Sum of four-year period.

As Table 5 shows, the dispersion of wage rates increased considerably. This was due mainly to changes in the dispersion of average wage rates between professions, and only to a much lesser extent to changes in dispersion between the wage rates of grades within each professional scale.* The increase in the dispersion of wage rates since 1978 is somewhat surprising, since during that period, the linkage of wage rates between professions, either formally or as a norm of negotiations, was regarded as a dominant characteristic of public sector wage policy (Sussman and Zakai, 1985). Note that since the weight of wage rates in total wages declined greatly, the contribution of collective agreements to the increase in total wage dispersion (dispersion multiplied by weight) was negative, except from 1978 to 1982. During that period the increase in the dispersion of wage rates was so great that it dominated the decline in weight and contributed 91 percent of the change in total wage dispersion of wage rates which by itself was very large**.

6. WERE WAGE DIFFERENTIALS NON-FUNCTIONAL?

At the beginning of the period reviewed, wage differentials were relatively small and the wage system was denied the flexibility required for motivation and efficiency. It became possible to reward employees as the alternative machinery of supplements and promotion increased in importance, and wage rate increases stipulated by collective agreements became affected less by the uniform increases of the framework agreements and more by differentiation by profession. Some indication of the relation between pay and performance at the beginning of the period is evident from a comparison of the increase in wages of talented young employees with elderly and less talented ones. We assumed that the rigidity of the wage system before the start of the period under review caused the wages of the talented young to be kept down, while increased flexibility enabled management to increase their rewards. Using a qualification index (the grade of an employee divided by his or her age), we found that the higher the index in 1974, the greater the increase in gross wages contributed by supplements from 1974 to 1978 (see Sussman and Zakai, 1985). However, the primary role of supplements and promotion as instruments for maintaining real wages eventually prevented them from being used selectively. Moreover, whatever positive effect they had on productivity at the beginning of the period quickly disappeared.

The large increase in wage differentials raises the question whether this was the result of market forces affecting the labor market, changes in macroeconomic variables such as the acceleration of inflation followed by its reduction, or other economic variables. Alternatively, the increase could be partly due to the changes in the wage determination process described above.

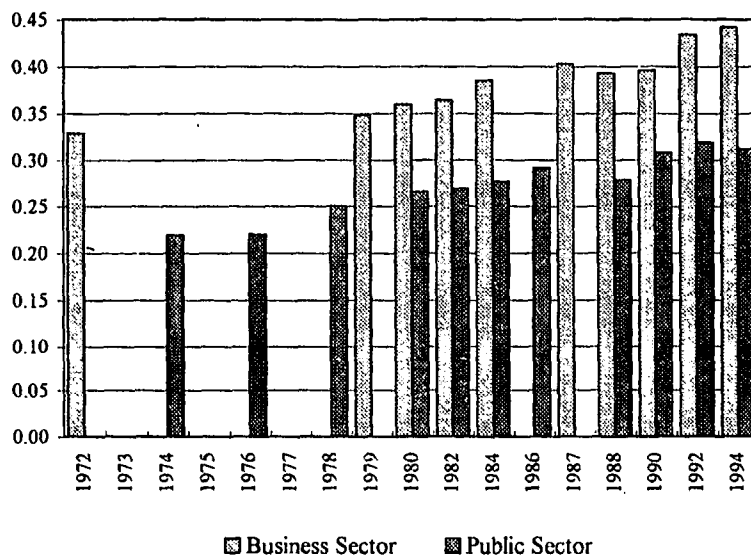
One way to examine this question is to compare the findings with wage dispersion in the business sector, where market forces play a greater role and the government is less involved in determining wages. Despite differences in the composition of employment in the two sectors with regard to human capital variables, a comparison

* The change in dispersion between professions from 1974 to 1994 was 0.285, compared with -0.02 between grades within professions.

** The present state of the data base did not enable us to distinguish the contribution of the adjustment mechanism to total wage dispersion by supplements, seniority, and promotion.

of this kind is not meaningless, because the main trends in the variables (average level of education and age and their dispersion, as well as changes in the share of women) were similar in the two sectors (Sussman and Zakai, 1994).

Figure 2: Wage Dispersion in the Public and Business Sectors
Gini coefficient, 1972 - 1994, Selected years.



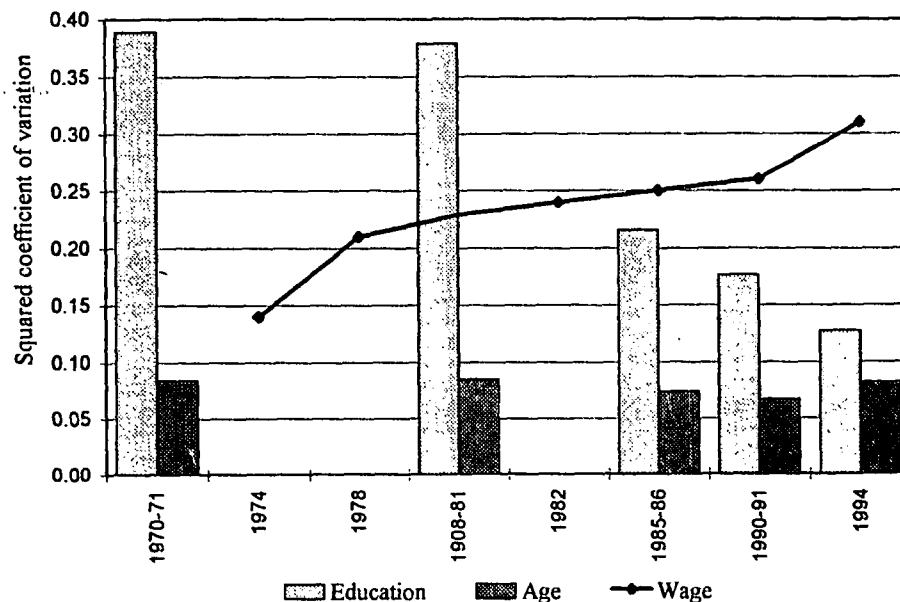
As Figure 2 shows, wage dispersion increased in both sectors throughout the whole period, although more so among public sector employees. The increase in overall dispersion has been attributed to accelerated inflation until the 1985 ESP (Achdut and Bigman, 1991), and in particular unanticipated inflation (Silber and Zilberfarb, 1994). After stabilization, the increase in dispersion continued and reflects the more decentralized wage determination in the public sector and in the private sector as well. Since 1990 differentials remained stable in the public sector, but continued to increase in the private sector. The recent increase in the private sector reflects among others the greater impact of the mass immigration from the former Soviet Union. At the end of the period, the relative gap between the two sectors had narrowed, compared to the beginning.

Another approach is to contrast the increase in wage dispersion with the dispersion of major human capital characteristics such as age (as a proxy for seniority and experience) and education. As Figure 3 shows, the dispersion of age and education declines among public sector employees as wage dispersion increases. Although such simple eye econometrics do not reveal the precise relationship between variables (and possible interactions), it provides circumstantial evidence indicating that the higher wage differentials were not dictated by changes in the quality of labor.

Some indication of the nature of the differentials can be derived from the fact that at the end of the period, wage dispersion among employees assigned to the same grade within the same profession was 76 percent higher than at the beginning of the period. Among such employees, the requirements of the job are fairly similar and it is hard to imagine that the differentials reflect actual changes in job performance, in the conditions of work among administrative units, or in seniority. An inspection of procedures for allocating wage supplements or promotions shows that little performance-related criteria were used in deciding which individuals should receive these benefits. Moreover, it is unlikely that the speed with which such supplements as travel allowances spread among employees and increased in money terms, corresponded to an actual increase in requirements for on the job travel.

* At this stage of our research, we have not been able to match satisfactorily human capital characteristics and wages, which are derived from two separate data bases for each employee.

Figure 3: Dispersion of Gross Wages and Human Capital Characteristics - Age and Education - Among Public Sector Employees, 1970-1994



Our view that wage differentials became excessive is also borne out by the low dispersion of remuneration in recently introduced personal contracts for top managers in the public sector. These contracts have gradually been replacing wage determination by collective agreements for senior officials. The contracts determine the appropriate lump sum remuneration for each individual in one of the grades at the top of the pay scale, and are not subject to adjustments by promotion and supplements. The effect of the contracts has been to considerably reduce the dispersion of wages at the top. On average, dispersion declined for officials at each grade who chose to change their employment status from one governed by collective agreements to one determined by personal contract. Moreover, the average dispersion of the remuneration of officials employed under personal contracts was considerably lower than the dispersion of wages of those in the same grade who chose to remain employed under collective agreements (Sussman and Zakai, 1994).

Although the evidence is not conclusive, it supports our view that the large and rapid increase in wage differentials is mainly the result of the reduced importance of collective agreements in determining wages, and the growing importance of adjustment mechanisms, rather than of changes in market forces. Despite some justification for mechanisms introducing greater flexibility, wage supplements got out of hand. It is our belief that by the end of the period much of the wage differentials were nonfunctional (i.e., unconnected with performance, motivation, or potential).

7. THE COSTS AND BENEFITS OF WAGE RESTRAINT POLICIES

This paper has not dealt explicitly with the macroeconomic consequences of restraint in the public sector.^{*} Instead, our focus has been on the effects of the adjustment mechanisms, in particular nonfunctional differentials, on the rise in wage dispersion. We now attempt to evaluate some of the microeconomic costs of the wage adjustment mechanisms which developed in the wake of continuous wage restraint.

A. The effect of adjustment mechanism on productivity

In the absence of ways of measuring productivity in the public sector, it is difficult to assess the quantitative effect of the adjustment mechanisms on performance. Certain channels of influence can, however, be identified:

a. For at least some of the period, eligibility for supplements required detailed reporting by the employee, e.g., amount of travel, overtime, etc. This system encouraged undertaking unnecessary activities in order to obtain financial rewards. A well-documented case was the supplement paid to physicians in hospitals for overtime worked, in order to reduce the waiting time for surgery and other treatments. A Public Commission found that these arrangements were not only "a fictitious solution for the remuneration problem in the health service, through hidden wage increases for work supposedly to be done by working overtime or a second shift...[but also] an incentive for carrying out additional diagnostic tests and ambulatory surgical operations..." (Commission of Inquiry, 1991, pp. 286-287).

b. A second channel through which the alternative machinery for wage determination negatively affected motivation and performance was the continuous negotiations regarding collective agreements throughout the term. The negotiations were conducted at lower management levels with local staff committees and it is reasonable to assume that the number of employees involved in bargaining over supplements and promotion increased. Protracted negotiations exact a high price: the operating costs of the wage-determination process, a decline in work satisfaction and motivation, and last (but not least), labor unrest and strikes. The detrimental effect of these changes on productivity in the public sector has been emphasized by two committees of experts which studied public sector administration and wage structure respectively. The committee examining of the administration found that both managers and employees felt that performance and efficiency had declined below acceptable levels during the period under review (Report 1990, pp. 223). The committee reviewing the wage system concluded that "to a large extent, these distortions and deficiencies [of the wage system] are the cause of the tense labor relations, slowdowns, and strikes...and are the cause of the lack of motivation to increase output, productivity, and the quality of services..." (Report 1989, pp. 1).

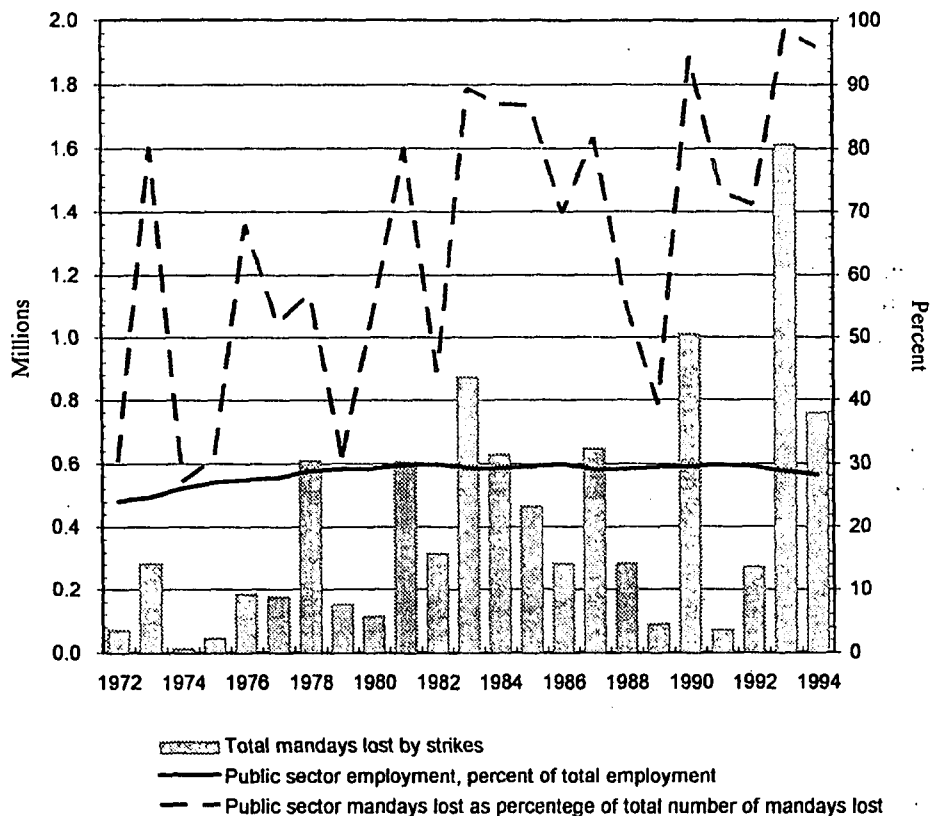
More direct evidence is provided by the high incidence of strikes in the public sector compared with all industries throughout the period under review. As Figure 4

^{*} On the contribution of wage policy to the success of the 1985 ESP by (temporarily) halting lower level wage determination, see Artstein and Sussman, 1990.

shows, the share of total man-days lost by strikes was much higher in the public sector than in total employment. The incidence of strikes in the public sector increased during the period, and peaked from 1982 to 1986. Moreover, the ongoing negotiations explain the high proportion of strikes in various parts of the public sector during the term covered by each collective agreement (Sussman and Zakai, 1985).

c. The unrestricted use of promotion blurred its effect as an incentive for motivation and effort. It is unlikely that annual rates of promotion of 40 to 50 percent of all employees represent assignments to new jobs higher up in the hierarchy, or rewards for outstanding performance. Moreover, the rapid vertical movement of workers on the scale of grades was far from smooth. New grades at the top were sometimes added with delays, causing large numbers of employees to be concentrated at the top grades. In this way the occupational (and managerial) hierarchy became disrupted temporarily, with damaging effects on authority and chains of command within the public sector bureaucracy.

Fig. 4: Strikes and Man-days Lost in the Public Sector, and Share in Total for All Industries



B. Uncertainty about Permanent Wages and Wage Claims

The growth in importance of the adjustment mechanisms increased uncertainty about an employee's monthly wage, and even greater uncertainty about his expected wage during a career in the public sector, and after retirement. The uncertainty created was of several kinds:

- a) There was no straightforward relation between investment in human capital, effort, and output, on one hand, and remuneration, on the other. Although higher grades were positively related to higher average age and remuneration (Sussman and Zakai, 1991), dispersion within grades was great. From the point of view of an individual employee, both promotion and supplements were allocated on an arbitrary basis.
- b) Supplements were awarded at irregular intervals, giving rise to monthly fluctuations in an employee's gross wage.
- c) The distinction between supplements reimbursing actual expenditure made by an employee in connection with his work, or compensation for a greater work load, and those which were part of his regular wage was blurred.
- d) The increase in pay upon promotion was not known in advance, since the dispersion of supplements within a given grade was wide and the amount of supplement granted to an employee at the higher grade was not clearly defined. In many cases, the increase in wages was fairly large and little fine-tuning was possible, while in others the rewards of promotion were negligible.
- e) Many of the supplements were not regarded as part of the wage for the purpose of calculating pension rights. The definition of pensionable and non-pensionable supplements did change during the period under review. Moreover, since pensions were defined according to the employee's grade at retirement, the real value of his pension was eroded, in line with the erosion of the wage rate (whereas the wage level of persons who remained employed was also maintained by frequent promotions).
- f) As the previous sections indicate, it was almost impossible for a public sector employee to assess his or her permanent wage. This was particularly the case with regard to the assessment of his relative wage, to the wages of others which could be regarded as a standard of reference for wage comparisons.

Some increase in uncertainty with regard to an employees' wage was to be expected during the period of accelerated inflation until 1985. However, supplements and promotions compounded the uncertainty. More importantly, uncertainty persisted after the ESP. Some indication of the quantitative impact is given in Table 7, which

* From time to time *ad hoc* adjustments were made in pensioners' wages in order to restore some of the value lost.

shows the distribution of rates of change in the real wage of individual employees during the 4-year periods.

Table 7

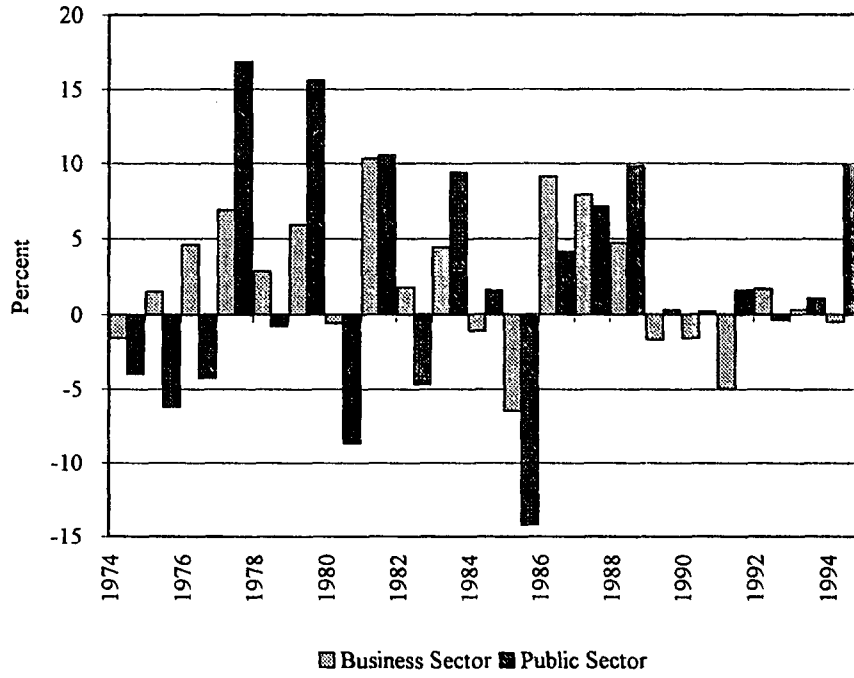
Distribution of Employees in the Public Sector Whose Real Wage Declined within a 4 Year Period, 1974-1994

Period	Percent of Employees Whose Wage Declined by		
	0 to 3%	3% to 6%	More than 6%
1974-78	6.4	6.0	19.5
1978-82	2.3	1.7	6.4
1982-86	5.5	6.6	55.1
1986-90	1.7	1.3	5.7
1990-94	2.8	1.9	5.9

The aggregate effect of the variability over time of individual wages of public sector employees can be seen by comparing fluctuations in average real wages in the public sector, and in the business sector (see Figure 5).

It is beyond the scope of this paper to assess the full cost of the increase in uncertainty in terms of efforts invested by individual employees in obtaining the supplements and promotions that were essential for maintaining their real wages. In addition, assuming that public sector employees are probably more risk averse, it was necessary to compensate them for the increase in uncertainty with higher wages without actually making them better off.

Figure 5: Annual Rates of Change of the Real Average Wage in the Public and Business Sector, 1974 - 1994.



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APPENDIX A**Decomposition of Total Variance into Levels**

The variance has been decomposed as follows:

W = gross wages

i, j, p , index of employee i , grade j and professional scale p .

N = total number of employees

\bar{W} = mean gross wage (of the population or as indexed)

$$\frac{1}{N} \sum_p \sum_j \sum_i (W_{ip} - \bar{W})^2 = \frac{1}{N} \sum_p \sum_j \sum_i (W_{ip} - \bar{W}_{jp})^2 + \frac{1}{N} \sum_p \sum_j N_{jp} (W_{jp} - \bar{W}_p)^2 + \frac{1}{N} \sum_p N_p (\bar{W}_p - \bar{W})^2$$

The squared coefficient of variation measuring the (weighted) contribution of each level to the coefficient of variation of the gross wages of all employees is obtained by dividing each term by the population mean.

Decomposition of Total Variance into Wage Components.

The variance has been decomposed as follows:

W = gross wages

TAWZ = wage rates standardized at zero seniority

RES = $W - TAWZ$ = Residual Supplements

$$\frac{\text{Var}(W)}{\bar{W}^2} = \frac{\text{Var}(TAWZ)}{\bar{W}^2} + \frac{\text{Var}(\text{RES})}{\bar{W}^2} + \frac{2 \text{cov}(TAWZ, \text{RES})}{\bar{W}^2}$$

The contribution can also be calculated by weighting the variance of each component, standardized by its (squared) average:

$$\begin{aligned} \frac{\text{Var}(W)}{\bar{W}^2} &= \frac{\text{Var}(TAWZ)}{\text{TAWZ}^2} \times \frac{\overline{\text{TAWZ}^2}}{\bar{W}^2} + \frac{\text{Var}(\text{RES})}{\text{RES}^2} \times \frac{\overline{\text{RES}^2}}{\bar{W}^2} \\ &+ \frac{2 \text{cov}(TAWZ, \text{RES})}{\text{TAWZ} \times \text{RES}} \times \frac{\overline{\text{TAWZ} \times \text{RES}}}{\bar{W}^2} \end{aligned}$$

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