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**From Promoting the Worthy to Promoting All:
The Public Sector in Israel 1975-1999**

by

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Abstract

From the middle of the 70's until 1992, the percentage of employees promoted each year increased rapidly, in response to the high rates of inflation which would have led to large erosions of the nominal wage increases determined by the collective agreements. As the rate of inflation declined after 1985, the rate of promotion started to decline, too, but so far remained above its pre-inflation level. We attempt to measure non-distortionary promotion and found that a substantial amount of distortionary promotion was implemented during high inflation and after stabilization. We also investigate whether despite the high "excess" promotion rates for almost all, the "worthy" as defined by talent at the start of the beginning of the period and a record of "fast track" afterwards, were promoted even faster. Despite the change in the use of promotion less as a reward of employees for achievements and qualification to more of an instrument for preserving real wages, we found that "fast track" did affect promotion (as found in other studies). Talent too, did have a significant, albeit small effect in explaining individual differences in promotion rates. Also, we found a significant, but small effect of individual promotion rates on changes in individual real wages. The effect of arbitrariness (or randomness) in explaining promotion rates and changes in wages, which increased during high inflation, perhaps increased even more after stabilization and remained so far fairly high.

From Promoting the Worthy to Promoting Almost All: The Public Sector in Israel 1975-1999¹

I. Introduction

From the middle of the 70s until 1992 the process of wage determination in the public sector in Israel was characterized by nominal wage increases in collective agreements (basic wage and COL) which, given the high and accelerating rates of inflation would have led to large reductions in real wages.

The erosion of wages by the collective agreements led to the spread of compensating wage adjustments, after extended labor unrest and strikes in the public sector (Sussman and Zakai, 1996):

- (a) The proliferation of individual wage supplements. Almost all these supplements (such as car and clothing allowances, overtime, etc.) were unrelated to actual activities by the employee or to actual expenditures by the employee in the performance of her job.
- (b) The growing importance of promotion as an overall wage adjustment as opposed to a tool for rewarding employees assigned to higher ranks in the hierarchy or performing exceptionally well in their job. The percentage of employees promoted each year increased rapidly, as well as the average contribution of a promotion to an employee's salary.

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Thus, a two-tier wage determination system evolved in the public sector with only part of the remuneration – mainly basic wages – determined centrally or by collective agreements with professional unions, and an increasing part of the remuneration – mainly individual wage supplements and promotion - determined at much lower levels of negotiation (Table 1).

Table 1:

The Contribution to Wages of Collective Agreements, Promotion and Individual Supplements in the Public Sector

Period	Contribution of Collective Agreements to Real Wages	Contribution of Promotion to Real Wages	Contribution of Individual Supplements to Real Wages	Total Increases in Real Wages
1967-70	0	6	0	6
1971-73*	-19	12	27	15
1974-78	-25	5	40	11
1978-82	-18	21	24	23
1983-86	-18	25	-6	-4
1987-90	-9	26	16	33
1991-94	-4	6	5	7
1992-97*,**	-6	22	18	35

* The rates of change have been standardized for four years.

** For technical reasons, the last period in this table overlaps partially with the previous one.

Initially, maintaining real wages by increases granted at lower levels of negotiation and on a more individual basis could have been expected to create a more flexible wage structure, through greater responsiveness to market forces as well as to individual motivation and performance (OECD, 1994). However, through their rapid spread, these compensating adjustments lost gradually whatever advantages they had as instruments for rewarding the few. In particular, large scale promotions of 40-50 percent of all workers annually reduced the effectiveness of the most important (and perhaps only) means for incentive-based pay in the public sector in Israel, given that piece rates, bonuses and dismissals for reasons of low performance are almost non-existent (Sussman and Zakai, 1996). As inflation increased and promotions were used widely as compensating wage adjustments, employees could find it more difficult to ascertain to what extent being promoted is still a reward for effort and ability, or an overall adjustment for wage erosion. This blurring of the incentive effect of a promotion is similar to the effect of “noise” in compensation contracts where remuneration is a function of effort and noise. At the margin, a utility maximising employee will equate her additional effort to additional remuneration of effort. The more expected remuneration will be the result of “noise” and the less the result of effort, the employee will tend to reduce her effort (see Gibbons, 1998).²

As the rate of inflation declined after the successful stabilization of 1985, the role of wage supplements and promotions in preventing the erosion of real wages became redundant. Indeed, their respective contribution to total wages started to decline, but so far

²A somewhat different way of looking at the effect of indiscriminate mass promotion on blurring its incentive effect is by analogy to the well-known hypothesis that at high rates of inflation individuals who do not have full information about the general price level might confuse changes in the price level with changes in relative prices and decide on their supply on this misinterpretation (Lucas, 1973). For a more recent exposition see Chang, Cheng, 2000.

remained above their pre-inflation level. Moreover, given the present 2-3 percent annual rates of inflation, past rates of promotion which became the norm at two and three digit inflation, are now greatly excessive because they might force unwarranted increases in real wages. Therefore, little scope has been left for 'normal' wages increases through collective bargaining in the public sector, causing labor unrest or excessive wage increases in the wage agreements.

Recently, attempts were made by the unions and the public employer to reestablish the supremacy of collective agreements by incorporating certain wage supplements into basic wages.

Also, in the last comprehensive agreements (1993-1997) a minimum rate of promotion for each employee (one promotion in three years) was specified. This did increase the wage determined by these agreements but also further tended to reduce the role of promotions as an instrument for assigning to higher level jobs or as an incentive.³

The purpose of the present paper is to focus on the changes in the role of promotion in the public sector during periods of accelerating inflation and after stabilization. In particular, we attempt to measure how much excess promotion was generated during high inflation and after stabilization and whether despite high "excess" promotion rates for almost all, the "worthy" were promoted even faster. The second section of the paper presents a brief account of the internal labor market of the public sector, the hierarchy of ranks and the role of promotion. The third section describes the changes in the frequency of promotions during inflation and stabilization and in their contribution to total wages.

³ It is too early to judge whether these developments are a one-time event at the transition from inflation to price stability or a new trend in wage determinants in the public sector.

The fourth section presents a simple model for determining the scope for “non-distortionary” promotions. The fifth section analyzes differences in individual promotion rates and in particular whether behind the veil of the policy of “promoting almost all”, the effect of fast track and talent on promotion can be identified. The last section deals with the effect of promotion on wages of individual employees.

The role of promotion in determining changes of wages of individual employees has been documented for a number of firms in the business sector, such as the study by Baker, Gibbs, Holmstrom (1994a and b). We hope that the access to wage data of individual employees in the public sector since 1975 and the substantial changes in promotion policy during this period, will provide additional insight on the use and possible abuse of promotion in the wage determination process, in a different institutional environment.

II. Hierarchy of Ranks, and Internal Labor Market in the Public Sector

It is well-known that promotion serves two important and distinctive purposes. It is a potent incentive to induce effort in the performance of jobs and also a mechanism for matching employees who have the required qualification (ability, experience, training and education) to vacant jobs to which they are best suited (Baker et. al. 1988). However, we have reason to believe that in the day to day practice of managing human resources in bureaucracies, promotion in its dual role will usually result in the assignment of an employee to a job higher up in the hierarchy.

First, there is empirical evidence that promotions without an upward move in the hierarchy or increased job responsibilities or work duties are normally not very frequent.

According to a research study about promotion based on the U.S. National Longitudinal Survey of Youth, only one third of the respondents stated that they performed the same job duties before and after promotion (Cobb-Clark, Dunlop, 1999). Analyzing the replies, the researchers concluded that “promotions are linked to increased responsibilities and a change of work duties” (pp. 34).

Second, Baker, Gibbs, Holmstrom (1994a) who analysed a medium-sized U.S. firm in a service industry found that the hierarchy was stable after a fourteen year period despite a tripling of employment: As the firm expanded, it did so proportionately across levels and the number of levels did not change (pp. 893-94). This also points to the use of promotions as an assignment mechanism to job vacancies at higher levels.

Basically, the hierarchy of ranks of administrative employees in the public sector in Israel is different from the theoretical hierarchies which are a result of optimizing the span of control and the number of levels, or ranks in the hierarchy and which turns out to be pyramid shaped.⁴ Empirical evidence on the distribution of employees among levels in the hierarchy is less conclusive: Baker, Gibbs, Holmstrom (1994a) found a decreasing number of employees at each level, moving up from bottom to top. As can be seen from Figure 1, the hierarchy in the public sector in Israel is more “diamond” shaped, with large groups of employees assigned to the middle level, and smaller ones at the bottom and the top. For comparison we show the distribution of employees in the public sector in Italy (for which relevant data was available) among levels which also is diamond-shaped (Dell’Aringa, C.,

⁴ For a recent formulation of a model which focuses on optimizing the number of hierarchial tiers, the span of control of a superior and the gap between wages in the scale, in order to maximize the net revenue of an economic organization engaged in production, see Qian, (1994).

1995).⁵ The “diamond” shape of the Israel public sector distribution could result from our particular data base which does not include all low skill employees at the lower end of the hierarchy as well as those formally employed by business sector contractors performing those low skilled jobs.

Another possible explanation of the “diamond” shape could be that in the lower grades a single level of hierarchy is populated by employees assigned to a number of entry grades, whereas at the higher levels, the correlation between one specific grade and one specific level is much stronger. Therefore using grades as a proxy for level is more appropriate at higher levels than at lower ones.⁶

A long career is one of the dominant characteristics of employment in the public sector: about one half of those who took up an administrative job in the sector in 1984 were still employed in 1999; 70 percent with tenure of ten to twenty years in 1984 were still employed in the public sector in 1992, after eight years.⁷ Involuntary dismissals are a rare occurrence and because of the pension system, voluntary quits after the age of 30-35 are also low.

⁵The view that hierarchial job structures resemble pyramids in manufacturing but that in the support industries they are more diamond-shaped is advanced by Craypo, Cormier (2000).

⁶ A possible check of this explanation would be that at lower levels, talent and experience which are related to level, are less potent explanations of grade than at higher ones. We found the opposite effect in our data. On the other hand, the number of levels in the U.S. firm and the Italian public sector are considerably smaller (7-8 levels) compared to the public sector in Israel (12-13 levels), pointing to an “artificial” spread of grades in Israel.

⁷ Hall (1982) found for the U.S. that of all the workers employed in 1978, 9.5 percent had been in the job for twenty or more years, and 23.2 percent ten years and more. Hall also computed “eventual tenure” as the sum of actual reported tenure and the projected additional time on the job. His estimates of “eventual tenure” are that 43 percent will last more than ten years in their job, and 28 percent twenty years or more.

The occupational hierarchy in the public service in Israel is characterized by strata of jobs, for each of which there is a small range of grades. According to the rules, incumbents have priority for assignment to a higher ranking job, and only if no suitable candidate within the service is available, the vacancy is opened to outside applicants. We checked to what extent the administrative scale of the public sector is an “internal” labor market in practice too. We compared in 1999 the employees assigned to two highly populated senior grades with at least 7 years seniority who were promoted from lower grades, to those appointed from outside the sector. The results (Figure 2) show that at the lower of the two grades (level 6), 77 percent were incumbents promoted from below and 23 percent outside hires. At the higher grade (level 9), 95 percent were promoted from grades below and only 5 percent were outside hires.⁸

III. Promotion During High Inflation

Before the beginning of the 1970s the percentage of employees annually promoted was less than 20 percent and promotions mainly reflected the employer’s decision to advance the employee in the hierarchy. With the increase in inflation, promotion became one of the instruments of preserving real wages.⁹ As may be seen from Table 2 and Figure 3, the rate of promotions accelerated considerably during the period reviewed, and there were even years in which about one half of all employees were promoted.

⁸In 1984 and 1992, the percentage of incumbents promoted to these grades were lower, i.e., the internal labor market became more pronounced towards the end of the period.

⁹Past periods of formal wage restraint also witnessed increased rates of promotion (e.g., 1959 and 1970-71) but before the period under study the rate of promotion had never been very high, year after year (Sussman and Zakai, 1985).

Table 2:**Percentage of all Civil Service Employees Promoted: 1962-99 (Annual Average)**

Period	Rate of Inflation	Percent Promoted
1962-69	5.3	18.0
1970-73	12.7	36.9
1974-77	36.2	47.7
1978-89	97.2	43.2
1990-95	13.5	(33.0)*
1996-99	7.7	(30.0)*

* Estimated from a different data base.

The processes of accelerated promotions exhibited several characteristics:

- (a) The percentage of employees annually promoted follows rather closely the increase in the rate of inflation and the erosion of the nominal wage increases determined in collective agreements and in particular by the less effective C.O.L. agreement at high and variable rates of inflation.¹⁰

¹⁰A study on the effectiveness of the C.O.L. agreement in protecting real wages found that at the higher rates of unexpected inflation from 1973 to 1985, the unprotected part of wages increased considerably (Shiffer, 1999).

(b) Following the decline in inflation after 1985, the rate of promotion also started to decline with a lag, but has not yet returned to the pre-inflation rates.

Figure 4 shows the distribution of employees among grades at two points of time: 1975 and 1999. The distribution at 1975 is given twice: first the actual distribution and second the same distribution shifted forward until the modal grade in 1975 overlaps the modal grade in 1999. By this, the changes in the shape of the distribution as opposed to its shift to the right, stand out.¹¹

As can be seen from Figure 4, the main change was less in the shape of the distribution and much more its shift to the right: There was continuous movement of the employees over the grade ladder as the grades of the bottom levels were no longer manned and were discontinued and new grades were added and manned – mainly at the top of the grade scale. As a result, the modal grade in 1999 was nine grades higher than the modal grade in 1975. Thus, the rate of promotion could be increased without much change in the distribution of employees among grades, albeit affecting labor costs and blurring the use of promotion as an incentive. We have estimated that the shift of the distribution more than fully explains the increase in promotion from 1975 to 1999, whereas the change in the shape of the distribution reduced promotion opportunities by about one grade.

A different measure of the changes in the shape of the distribution can be seen from the increase in the percentage of employees in the four top grades. Table 3 also shows the change in the number of effectively occupied levels, from 1975 to 1999.

¹¹The almost “normal” shape of the distribution of employees among ranks tempts us to suggest that grades are rewards for “ability” rather than the result of assignment to levels of the hierarchy.

Table 3:
The Distribution of All Employees Among Top Grades - 1975-1999

	Percent of Employees in the Top Four Grades	Number of Effectively Occupied Grades
1975	1.5	15
1984	4.5	12
1992	7.4	11
1999	5.3	13

As can be seen from the table the relative size of the top of the hierarchy did increase until 1992, and then started to decline to some extent. The number of grades effectively occupied declined after 1975, but is still relatively high, compared to levels of hierarchies found in other studies. A possible explanation of the larger number of grades is that as already mentioned, at the bottom of the hierarchy a number of entry grades corresponded to a single level in the hierarchy.

Promotion is important to the employee because of the advance in the hierarchy, and because of the substantial increase in salary. At the beginning of the period the basic wage determined for each grade in the formal pay scale was the major part of the total wage of an employee and rose automatically with her promotion. Gradually individual wage supplements became more important.

Because the amount of wage supplements granted to each employee in a given grade varies considerably, total wages of the employees of each grade are spread over a fairly

large range (see Figure 5). In our database total variance (the coefficient of variation) among wages of employees in the same grade more than doubled between 1975 and 1999. By the end of the period almost a quarter of the variance of total wages stems from wage gaps among employees in the same grade. In theory, employees could move from the lower to end of the wage distribution within a grade to the upper end in between promotions, acquiring additional supplements during this process. In such extreme case, promotion would merely move the employee from the upper end of one grade to the lower end of the next, reducing the effect of a promotion on wages. However, as the annual rate of promotion from each grade did increase, it was likely that employees would be promoted from the whole range of the lower grade to the whole range of the upper grade. A number of checks have shown that indeed the wages of most employees promoted do increase at a rate similar to the average gap between the grades, including the average amount of supplements of each grade (Dar, 1995)¹².

During the period under review the effect of promotion on the wages of an employee did increase not only because of higher frequencies of promotion but because the potential effect of each single promotion on the wage increased as the spread between wages of the grades in the scale did increase too.

The effect of promotion on wages can be measured by the theoretical value of a full upgrading (each employee moving one grade) at a given point of time, assuming that employees do not receive additional wage increases on top of the promotion to a higher rank. This value depends on the number of grades of the scale, the spread between the

¹²This finding is different from those of Baker, Gibbs, Holmstrom (1994b) that those who get promoted earn an above average salary in their old level, but end up earning a below average salary in their new level.

average wages of the grades, and the distribution of employees among the grades of a scale, before promotion. As a first approximation changes in the (theoretical) value of a full upgrade can be used as an indicator of the changes in the importance of promotion over time.

Table 4 presents the theoretical value of a full upgrading during the period under review.¹³ As can be seen from the table, the value of a full upgrading did increase until 1990. The major factor contributing to the change in the value of a full upgrade has been the increase in the spread between the average wage of the grades, and not changes in the distribution of employees.

Table 4:
Theoretical Value of Upgrade of All Employees, 1975-1999

	Contributions to Increases in Total Wages *	Spread Between Average Wages of Grades **
1974	8	0.053
1982	11	0.078***
1990	13	0.087
1999	13	0.101

* Administrative scale

** Coefficient variation, administrative and other professional scales

*** 1984

¹³As will be shown in Section V, in fact the rate of promotion was not strictly uniform for all employees. Therefore an average annual promotion rate of say 50 percent is not necessarily equivalent to 50 percent of a “full upgrading”.

IV. **Non-Distortionary Promotion**

We derive our definition on non-distortionary promotion from the assumption that the hierarchy of ranks is “optimal” in the base period and is stable. It is beyond the scope of the present paper to present a formalized model of optimal hierarchies, and in particular optimal hierarchy in the public sector. At this stage we define non-distortionary promotions somewhat narrowly as those preserving the “optimal” hierarchy at the beginning of each sub-period i.e. 1975, for analysing changes from 1975 to 1984, and so on.

First and foremost, our definition regards as non-distortory the promotion of an employee who is qualified to a higher job, and the job is vacant.

Further, our definition regards as non distortionary the use of promotions as a reward for performance of an individual employee at her present post in the hierarchy, as long as it results in an assignment to a vacant post at a higher level. Also, our definition ensures that since promotions will be made only if a vacancy occurs at a higher level, they will not effect the employers’ average labor costs per employee. This does not preclude rewarding investment in human capital by employees along their career either by non-distortionary promotion to a vacant higher ranking job or by the (automatic) increase in seniority.¹⁴ Nor does it preclude increases in basic wages by collective agreements justified by increases in overall productivity which might also justify an increase in the employer’s average labor costs.

¹⁴If the result is an increase in the average stock of human capital employed, it might justify an increase in the proportion of middle and higher rank positions. Since for technical reasons our data base does not include employees who have completed formal higher education during their career, the effect of such a possible increase of human capital on non-distortionary promotion is negligible.

We would also like to stress that our definition of “non-distortionary” promotion does classify, perhaps wrongly, as “distortionary” the (less frequent) use of promotion as a reward for performance, without assigning the individual to a vacant higher rank in the hierarchy.¹⁵ In any case, due to the lack of data on the performance of public sector employees, we have to stick to our more restrictive definition of non-distortionary promotions.

If we assume that in the base period the existing hierarchy of ranks reflects the preferred organizational structure of the public sector, i.e., the number of levels and the number of employees assigned to each level, the promotion opportunities available each period without distorting the hierarchical structure and without increasing the average labor costs of the employer will depend positively or negatively on:

- (a) The posts vacated at each rank by employees retiring or leaving the public service for other reasons (positive).
- (b) The posts vacated at each rank by employees being promoted from that rank to a vacancy at a higher rank (positive).
- (c) Vacancies created by the expansion of the public sector. It is assumed that each rank will expand at the same rate in order to maintain the same hierarchical structure (positive).
- (d) Vacancies filled by outside appointments to ranks where vacancies are available (negative).

¹⁵ For a recent survey of the use of promotion as a potent incentive in organizations, see Prendergast, 1999. In the unavoidable trade-off between promotion as an incentive and as an assignment, probably doing neither perfectly, see Gibbons, Waldman, 1999.

The effect of each of the above variables on the rate of promotion has already been well documented: Promotion rates do increase during periods of firm expansion (Baker et al. 1988, Ariga et al. 1992), promotion depends on an internal labor market where most employees join at entry level positions and senior vacancies are filled from within (Demougin, Siow, 1994). It is our intention to incorporate these effects into a simple model which allows to calculate the effect of each of these variables separately and also their combined effect on the availability of non-distortionary promotions in each period.

Let us assume a simple case where the hierarchy compasses k ranks with N_i employees at each rank $_i$ in the base period t . Entry into the service is at the lowest rank, and the rate of expansion of the service from t to $t+1$ equals a , at all ranks. The number of promotions P_i from rank r_i to the higher rank r_{i+1} will depend on new jobs created by the expansion of rank r_{i+1} and existing jobs vacated by the employees promoted from rank $_{i+1}$ to rank $_{i+2}$, and so on:

$$(1) \quad P_i = a(N_{i+1} + N_{i+2} + \dots + N_k)$$

where k is the last rank in the hierarchy.

The number of all promotions from all ranks, given the rate of expansion a without quits, and entry only at the lowest rank $_1$ will be:

$$(2) \quad \sum_{i=1}^{k-1} P_i = a(N_2 + 2N_3 + \dots + (k-1)N_k)$$

With quits Q_i and hires H_i at each rank $_i$ the overall number of promotions P is: T

$$(3) P = \sum_{i=1}^{k-1} P_i = a\{[N_2 + (Q-H)_2] + 2[N_3 + (Q-H)_3] + \dots + k-1[N_k + (Q-H)_k]\}$$

The faster the rate of expansion of the public sector, the more non-distortionary promotions will be created. The higher the rates of quits, the more additional promotion opportunities will become available. The more vacancies will be created at higher ranks, the more promotions will be available from the lower ranks up: Jobs vacated at the top will create a chain of promotion opportunities, jobs vacated at lower ranks will create less promotion opportunities (at the smaller number of ranks below). Hiring from outside will reduce promotion to ranks to which hires are assigned and at ranks below. More hires at higher ranks will reduce promotion opportunities more; entry at the bottom of the ladder will maximize promotion opportunities. Finally, the steeper the pyramid of ranks (relatively less jobs at the top), the less non-distortionary promotions will be created by a given expansion.

We have derived the amount of available non-distortionary promotions from the declared policy of the public sector to prefer promoting incumbents to medium and higher ranking jobs, rather than recruiting outsiders. Therefore for calculating the upper limit of non-distortionary promotions, we did assume that the internal labor market is perfect, so that for each vacancy above the lowest rank, priority is for promoting incumbents. This assumption is supported by our finding that an internal labor market does indeed prevail in practice in the public sector (Figure 2).

Table 5 presents the non-distortionary and total number of promotions for the periods 1975-84, 1984-92 and 1992-1999. Rates of promotions for each period have been calculated by dividing the number of promotions P_i from rank r_i to r_{i+1} by the number of continuously employed at rank r_i in the base period t . The rate of promotions for all employees will be ΣP_i divided by the number of all continuously employed ΣN at the base period t .

As can be seen from the table, actual promotion rates were much higher than the non-distortionary rate. “Excess” promotion did increase from 2.1 to their peak of 2.4 during 1984-92 and then declined to 1.3 excess promotions during 1992-99, after inflation was stabilized. Given the slow rate of expansion of the administrative scale, the main factor creating non-distortionary promotion opportunities was the interaction between actual quits which tended to be concentrated at senior ranks, and hiring at lower ranks, which became more effective during the last period: hires at actual ranks did reduce the promotion potential by only 0.6 grades, compared to a strict implementation of the hiring policy at the bottom.¹⁶ Finally, the low promotion rates before the start of inflation in the 1970s - about 1.4 promotions for the eight year period 1962-69 (Table 2) - suggest little “excess” promotion during this period, assuming that non-distortionary promotion rates in the public sector tend to fluctuate between a range of 1.5 to 2.0 promotion for 8 year periods (Table 5)

¹⁶ The negligible effect of the slow rate of expansion on non-distortionary promotion opportunities in our calculations illustrates the assertion by Baker et. al. (1988) that “another important problem with promotion-based reward system is that they require organizational growth to feed the reward system.” (pp. 600).

Table 5:
Non-Distortionary and Promotions 1975-1999

	1975-84*	1984-92*	1992-99*
Rate of expansion	0.0	0.1	2.7

Non-Distortionary Promotion Rates**			
1) Expansion only assuming no quits and hires only at rank ₁	0.0	0.1	0.1
2) Expansion with actual quits and with hires at actual rank _i hired	0.6	0.2	0.9
3) Expansion with actual quits and hires only at rank ₁	2.0	1.5	1.5
Average Rate of Actual Promotions***	4.1	3.9	2.8
“Excess” Promotion (Actual Promotions Less			
Row 3)	2.1	2.4	1.3

* Due to limitations of the data base the periods are of unequal length (9, 8, 7 years respectively) but have been standardized to eight years.

** Number of promotions during each period (standardized) per employee continuously employed.

*** Moving from the administrative scale to a professional one or to employment under a personal contract has been counted here as a quit.

Given the actual distribution of employees among ranks in each base period, more non-distortionary promotion opportunities will be available at lower ranks, and much less at higher ranks. Table 6 shows the differences both in opportunities and in actual promotion, among lower and higher ranks. As can be seen from the table, the expansion as such, as well as the combined effect of quits and hires create more non-distortionary promotion at lower ranks.

Actual (average) rates of promotion were also somewhat lower at higher ranks than at lower ones. That promotion rates decline with age or experience has been established in other research (Baker, Gibbs, Holmstrom, 1994a; McCue, 1996). Finally “excess” promotion is somewhat higher at higher ranks.

Table 6:
Non-Distortionary and All Promotions 1992-1999

	Higher Ranks*	Lower Ranks*
Rate of expansion (assumed to be uniform for all ranks)	2.7	2.7
Non-Distortionary Promotion Opportunities Rates**		
1) Expansion only, assuming no quits and hires only at rank ₁	0.1	0.2
2) Expansion with actual quits and with hires at actual rank _i hired.	0.6	0.9
3) Expansion with actual quits and hires only at rank ₁	1.0	1.4
Average Rate of Actual Promotions*	2.3	2.5
“Excess” Promotion (Actual Promotions Less Row 3)	1.3	1.1

* The two separate groups are not fully comparable to the 1992-97 figures for all employees, as presented in Table 5.

** See notes to Table 5.

V. Employees on a “Fast Track”

The rapid increase in the average rate of employees annually promoted reflected the indiscriminate use of promotions for preventing the erosion of real wages.

Table 7:
The Distribution of Rates of Promotion among Employees, 1975-1999**

Pomotions	<u>Percentage of Employees Promoted</u>			
	0-1	2-3	4-5	6 and More
1975-84*	0.2	14.2	55.0	30.5
1984-92*	4.6	41.1	40.9	13.4
1992-99*	24.2	67.3	8.4	0.2

* Continuously employed during each sub-period not standardized for the number of years.

** The number of promotions in each group include also those promoted by a half grade, above the upper limit.

However as can be seen from Table 7, rates of promotion were not entirely uniform for all employees. Groups of employees did stand out by either very fast or very slow rates of promotion. This raises the question whether differences in promotion rates are the result of the existence of “fast trackers” – a well-defined group which (each consecutive period) is consistently promoted at faster rates - or are the result of “randomness” in the distribution of promotion among employees, each period.

Why should there be “fast trackers” in a firm or in the public sector? A number of reasons have been suggested which could explain this phenomenon. First there is luck – employees who are promoted first due to luck, might be regarded by their supervisor as if possessing some inherent quality and will be promoted at further rounds, only because of their previous promotion¹⁷. A different reason could be that their higher initial human capital or abilities makes them more receptive of on the job training and therefore more productive not only at their present job but also appropriate candidates for upward moves. Also, greater ability as such, either revealed at the time of hiring or later on could affect recurring promotions (Baker, Gibbs, Holmstrom, 1994a, 1994b). Finally, once an employee has been promoted, her value has been signaled to other employers and in order to retain her at the firm, further promotions (or increases in her wage by other means) are required (Gibbons, Waldman, 1999)¹⁸.

Our database allows us to test the prevalence of fast tracks in the public sector and its effect on wages in two stages. In this section we estimate the effect of the frequency of previous promotions of an employee on the rate of her current promotions. In the next section we estimate the effect of higher rates of promotion on wage growth.

¹⁷ On the role of luck in determining promotion probabilities, see Wise (1975).

¹⁸ If promotion mainly reflects firm specific human capital and employees do not differ much in the rate by which they learn, those promoted quickly will have to wait longer for their next promotion (Baker, Gibbs and Holstrom, 1994a). Also it could be that instead of “fast trackers”, the more typical situation is one of “late beginners” who having been assigned at a lower wage at the beginning and overcome this handicap during the next period. The “late beginner” will experience greater wage increases in the future, because she has shown her ability to catch up. Holding constant the quality of education, age at recruitment and other variables, the late beginner effect was found significant in a sample of 1000 executives of a state owned French firm (Chiappori et. al., 1999).

Following the recent study of Ariga et. al. (1999) and Lazear (1999) and taking into account the limitations of our data base, we have estimated the effect of past promotions on the rate of current promotion of an employee as follows:

$$(4) \text{ PR}_t = a_0 + a_1\text{PR}_{t-1} + a_2\text{JUN}_t + a_3\text{TAL}_{t-1} + a_4\text{SEX} + a_5\text{PER}$$

PR_t	The number of promotion in standardized period t.
PR_{t-1}	The number of promotions in standardized period t-1.
JUN_t	Dummy: Senior grades = 0; junior grades = 1; Distribution among seniors and juniors at the beginning of period t.
TAL_{t-1}	The grade relative to age at the beginning period of t-1.
SEX	Dummy, 1= Woman.
PER	Dummy, 1975-92 = 0; 1984-99=1.

In addition to the number of promotions during the previous period (PR_{t-1}) we have added a dummy variable for juniors since promotion rates of juniors have been found to be higher by previous research (Baker, Gibbs, Holstrom 1994a; Sussman, Zakai, 1998; see also Table 6).

The additional variable (TAL_{t-1}) might shed some light on whether in addition to the “dynamic” effect of being “fast trackers” in previous periods, there is also a “static” effect: employees with greater ability revealed immediately at the time of hiring or shortly afterwards have an additional advantage over “fast tracker” with regard to promotion. We have defined “talented” employees as those who were assigned to a high grade relative to

their age at the start of their career, compared to those who were assigned to lower grades. Employees at the base period have been classified according to a qualification index TAL_i , the employee's grade divided by his age at the beginning of the previous period.¹⁹

We have also included in the regression the gender of the employee in order to allow for the possibility of discrimination by gender, believed to prevail in the public sector, although to a lesser extent than in the business sector (Gross 1981).

Since we estimate one regression for two subperiods (promotion during 1984-92 and during 1992-99) we have added a dummy variable for each period, in order to capture differences in promotion opportunities, in promotion policy, in the rate of inflation and in the erosion of basic wages, etc.

The detailed results of the regression are presented in Appendix A. All the coefficients have the expected sign and are highly significant. The positive effect of the rate of promotion in one period on the rate in the following period supports the fast track hypothesis. Talent as defined here, i.e, a high grade relative to age at the beginning of the first period, has an additional positive effect on promotion in the second period.

As expected, being at junior ranks enhances promotion compared to senior ones and women tend to experience slower rates of promotion other things being equal. Finally, the period effect is significant. The effect of the period (dummy) variable was to lower promotion in 1992-99 compared to 1984-92.

¹⁹ A similar analysis of the relation between a qualification index Q_i of all employees employed in 1974 and the subsequent increase in their total wages was performed for the period 1974-78. The results did show that the higher the Q_i 74, the higher the percentage increase in gross wages during 1974-78 (Sussman and Zakai, 1985).

Although all the coefficients are significant, their contribution to explaining differences in promotion rates is rather moderate: only about 23.1 percent of the variation in promotion rates. This is probably due to the randomness introduced by the fact that mass promotion was done in steps, so that in each period part of the employees were after promotion, and part before. Moreover, the constant upgrading of jobs by the public employer in order to allow higher promotion rates, was also performed in rather arbitrary way.^{20 21}

Finally, we have checked directly the extent of substitution between promotion and individual wage supplements. It can be expected that employees who did not qualify for promotion were granted more individual supplements, or vice-versa.

At first we look at the importance of wage supplements for groups of low, medium and high promotion employees (Table 8).

²⁰ Estimating equation (4) for the second and third sub-periods separately shows a deterioration of its explanatory power in the last period.

²¹ The rate of promotion of employee_i during each period can be regarded as an adjustment from her present grade to her equilibrium grade GR_{it}^* . Estimates of GR_t^* in 1992 have shown that seniority, talent as measured by the variable TAL in 1975 and gender explain about 35 percent of the variation of grades. We have used the difference between the calculated grade of each employee (GR_{it}^*) and her actual grade, at the beginning of each period as an additional variable in equation (4) – an “error correction” variable. The addition of this variable did not improve the explanatory power of the regression.

Table 8:
Promotion Rate and Change in the Share of Individual Wage Supplements in Total Wages, 1975-1992* (Change, Percentage Points)

Promotions**	0-1	2-3	4-5	6 and More
Period				
1975-84	20.8	22.6	26.1	29.6
1984-92	19.6	19.3	17.7	14.6

* Due to the incorporation of certain supplements into basic wages during 1992-99, figures for this period have been omitted.

** The number of promotions in each group includes the half grade above the upper limit. The sub-periods are not standardized for the number of years.

As can be seen from the table, there is no consistent trend of substitution between promotion and wage supplements. During 1975-84, on average, the more promotion, the larger the increase in the share of supplements. On the other hand, during 1984-92, high promotion groups had somewhat lower increases in the share of their supplements. We have also checked the extent of substitution between promotion and wage supplements for individual employees by adding the change in the percentage of supplements²² to the promotion equation (4). When adding this variable to the regression it turned out to have a significant positive but small effect on promotions. However the addition of this variable did little to increase the regression's explanatory power. (See Appendix A, regression (2)).

$$^{22} \left(\frac{\text{Supplements}}{\text{Total Wage}} \right)_{it} - \left(\frac{\text{Supplements}}{\text{Total Wage}} \right)_{it-1}$$

VI. The Effect of Promotion on Wages

As has been shown (Figure 5) a higher grade is (on average) associated with considerably higher pay. However, given the dispersion of wages at each grade, an important question is to what extent does the grade of an individual employee determine her total wage. Moreover, how does the increment in wages of those promoted more frequently compare with increases in wages of those not promoted (or promoted slowly)? Wages of those not promoted did grow by increases granted to all employees: raises in basic wages and compensation for seniority determined by the collective agreements. Also, employees not promoted did have access to individual wage supplements granted to all. However, the allocation of individual wage supplements was slightly biased towards those promoted faster (Appendix A, regression (2)). Following Lazear (1999), we first present increases in average wages of 4 groups of employees with increasing promotion rates, continuously employed for each sub-period.

Table 9:
The Number of Promotions and Wage Growth, 1975-99*
 (Rate of change in Real Wages)

Promotions	0-1	2-3	4-5	6 and More
Period				
1975-84	0.7	32.6	45.8	69.5
1984-92	-10.1	5.4	23.1	42.0
1992-99	24.4	36.5	55.1	82.2

* See note to Table 8.

As can be seen from the table there is a strong positive relation between the number of promotions and the change in real wages, for all promotion groups of employees. Moreover, during the two periods of inflation (1975-84 and 1984-92), the group of low promotion employees (0-1 promotions) did not share the increase in real wages and during 1984-92 even experienced substantial declines.

A more elaborate test of the impact of promotion on wages is by regressing the change in the wages of each individual employee_{*i*} on the number of her promotions.

In order to capture the effect of promotion on wages, we have estimated two regressions.²³

First, the effect of the number of promotions (PR) on the change of the wage of employee *i*:

$$(5) \dot{W}_t = a_0 + a_1 PR_t$$

$$\text{where } \dot{W}_t = \frac{W_{it+1} - W_{it}}{W_{it}}$$

To the basic regression we have added the effect of other variables reflecting talent (TAL) and junior rank (JUN) at the beginning of the period, as well as gender (SEX). These additional variables have been found to affect the rate of promotion of an employee and should already be reflected by the rate of promotion (PR), but might have

²³For a somewhat similar approach (regressing changes in wages on the frequency of promotion) see Lazear (1999).

additional direct effects on the change in wages through their effect on individual wage supplements.

$$(6) \dot{W}_t = b_0 + b_1 PR_t + b_2 JUN_t + b_3 TAL_t + b_4 SEX$$

We have estimated equations (5) and (6) for all sub-periods combined (1975-84, 1984-92 and 1992-99) and added dummy variables for each period, in order to capture differences in the granting of individual wage supplements, the changing effect of a promotion on wages, etc. among sub-periods. The detailed results of the regression are presented in Appendix B. The rate of promotion, by itself, (with period dummies) explains about 21 percent of the variance of the rate of changes of wages, and its coefficient is highly significant (Appendix B, regression (1)). All the coefficients of equation (6) are highly significant too, and have the expected sign (Appendix B, regression (2)). The rate of promotion (PR) and talent (TAL) affect positively the rate of change of wages (TAL in addition to its positive effect on the rate of promotion). A junior rank (JUN) at the beginning of each sub-period affects negatively the rate of change of wages (in addition to its positive effect on promotion). Gender (SEX) affects positively the rate of change of wages, (in addition to its opposite effect on promotion). However the contribution of all the variables except the rate of promotion to the

explanation of total variance is small (an increase of R^2 adj. from 0.207 to 0.222).²⁴ The basic relationship between promotion to a higher grade and the increase in remuneration attached to this grade is subject to “disturbances” caused by the allocation of individual wage supplements in a somewhat arbitrary way, but perhaps also reflecting differential increases in the basic wage of each grade as determined by the collective agreements.²⁵

VII. Conclusions

The combined effect of accelerating inflation and collective agreements (determining basic wages and cost of living allowances) which did not prevent the erosion of the real wage of public sector employees furthered the spread of compensating individual wage supplements and promotion. It is beyond the scope of the present paper to try to explain why the collective agreements did not prevent wage erosion: whether accelerating inflation was unexpected at each point of time, whether collective agreements were used in a (futile?) attempt to restrain wages and prices, or whether at least at the beginning, more wage supplements and promotions were thought to introduce more flexibility into the wage structure. Also we have not attempted to explain the actual “mix” of individual wage supplements and promotion and in particular why promotion was used beyond its intended use for assignment and motivation.

²⁴ The change in the wage of employee_i during each period can be regarded as an adjustment to her equilibrium wage W_{it}^* . Estimates of W_{it}^* have shown that the grade, seniority and gender and the period dummies explain about 58 percent of the variation among wages. We have used the difference between the calculated wage of each employee (W_{it}^*) and her actual wage at the beginning of each period as an additional variable in equation (6) – an “error-correction” variable. This variable had the correct sign and did improve the explanatory power of regression (6) from R^2 adj. of 0.223 to 0.345. (See Appendix B, regression 3.) We believe that the “error correction” variable is more powerful in explaining changes in wages than rates of promotion because wages can be adjusted more gradually than promotion in discrete “jumps”.

²⁵ Estimating regression (6) for each subperiod separately, shows a deterioration of its explanatory power from the first to the third period.

Our measure of non-distortionary promotion rates shows that during the period under review, the expansion of the administrative scale of the public sector was small and had only a negligible effect on promotion opportunities. Actual quits, assuming a strict internal labor market (hires only at low ranks) would have created 1.5 to 2 non-distortionary promotions for eight year periods. For the first two sub-periods, hires at the actual higher ranks assigned to entrants reduced promotion opportunities for incumbents considerably. This effect was smaller for the last period when the internal labor market was implemented more strictly. During high inflation and its aftermath there was a substantial amount of distortionary promotion: the frequency of actual promotion exceeded by large non-distortionary promotion opportunities. In the last sub-period (1992-99) both promotion rates and distortionary promotion did decline.

The rapid increase in promotion rates which exceeded by large non-distortionary promotion opportunities suggest the prevalence of arbitrariness (or randomness) in allocating excessive promotion among individual employees. However, the variables found to affect positively promotion in other studies, such as previous promotion ("Fast Track") as well as "talent" (measured here by a high entry level rank relative to age) did affect promotion in our study. We also found that female employees were discriminated against by lower promotion rates. Unexpectedly we did not find substitution between promotion and supplements, at the individual level. However, the total variance of individual rates of promotion explained by all these variables is only 23 percent.

The grade of an employee is fairly important in determining her wage. Also the rate of promotion has a significant effect on the rates of changes of wages. However, its

contribution to explaining the variance of changes in real wages is only 21 percent. The addition of other variables (talent, the position in the hierarchy and gender) improve only slightly the explanatory power of our wage model, but adding an “error correction” variable (the difference between estimated equilibrium wages and actual wages of an employee) did increase the explanatory power of the regression.

Our findings tie in with the declining power of conventional human capital models to explain wages in the public sector. In another study (Sussman, Zakai., 1999) we showed that during high inflation, a simple human capital model explained only about 20% of total variance in both the business and public sectors (see Table 10).

Table 10:

Variance of Wages Explained by a Conventional Human Capital Model*

		R² Adjusted	
Period		Business Sector	Public Sector
High Inflation	1982	0.196	0.205
Post Stabilization	1988	0.301	0.301
	1992	0.372	0.265
	1996	0.435	0.281

* The variables included are level of Education, Occupation and Seniority.

The sample includes men only.

After stabilization, the explanatory power of the model increased sharply in the business sector, and reached about 44 percent. In the public sector, there was only a small increase after stabilization (from 21 to 28 percent) and in 1996, variance explained in the public sector was only two thirds of that explained in the business sector.²⁶

A priori it could be expected that the human capital model would explain more of the variance of wages in the public than in the business sector. This is because wages of an individual employee in the public sector are first and foremost determined by her level of education which assigns her to an occupational scale and her seniority, affecting her grade. In the business sector pay for performance is usually supposed to be more differentiated according to performance. In our study we found the opposite.

²⁶ Total wage dispersion - the Gini coefficient - increased considerably during high inflation (from 0.348 in 1979 to 0.427 in 1985) but declined somewhat after stabilization (to 0.409 in 1996). In the public sector, wage dispersion remained more or less stable from 1979 to 1985 (0.351 and 0.348 respectively), but did increase rapidly afterwards (to 0.428 in 1996). Coefficients kindly supplied by the National Insurance Institute data base.

Appendix A

Dependent Variable PRt	(1)	(2)
Constant	2.44 (49.6)	2.28 (45.3)
PR t-1	0.06 (9.6)	0.06 (10.1)
JUN _t	0.70 (30.4)	0.69 (30.0)
TAL _{t-1}	1.89 (16.8)	1.82 (16.2)
SEX (Women = 1)	-0.07 (-4.2)	-0.08 (-5.2)
PER3 (1992-99) =1*	-0.94 (-44.3)	-0.88 (-40.2)
Δ <u>supplements</u> _t total wages _t	—	0.64 (13.3)
R sq.adj.	0.230	0.237

t values are in brackets below the coefficient.

* Period 2 (1984- 92) = 0

Appendix B

Dependent Variable ΔW_t	(1)	(2)	(3)
Constant	-0.12 (-17.4)	-0.21 (-25.5)	-0.27 (-35.5)
PR_t	0.11 (89.1)	0.11 (89.3)	0.14 (118.2)
JUN_t	--	-0.04 (-8.6)	-0.07 (-18.5)
TAL_t	--	0.52 (29.7)	0.29 (17.8)
SEX (women = 1)	--	0.01 (4.68)	0.05 (16.0)
Error	--	--	0.60 (98.1)
Period 2 (1984-92)*	-0.11 (27.7)	-0.18 (039.4)	-0.16 (-39.9)
Period 3 (1992-99)*	0.29 (59.7)	0.17 (27.6)	0.21 (36.3)
R sq. adj.	0.207	0.223	0.345

t-values are in brackets below the coefficient.

* Period 1 (1975 – 1984) = 0

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Figure 1:
The Shape of the Hierarchy of a Business Sector Firm in the U.S. and the Public Sector, Israel, Italy

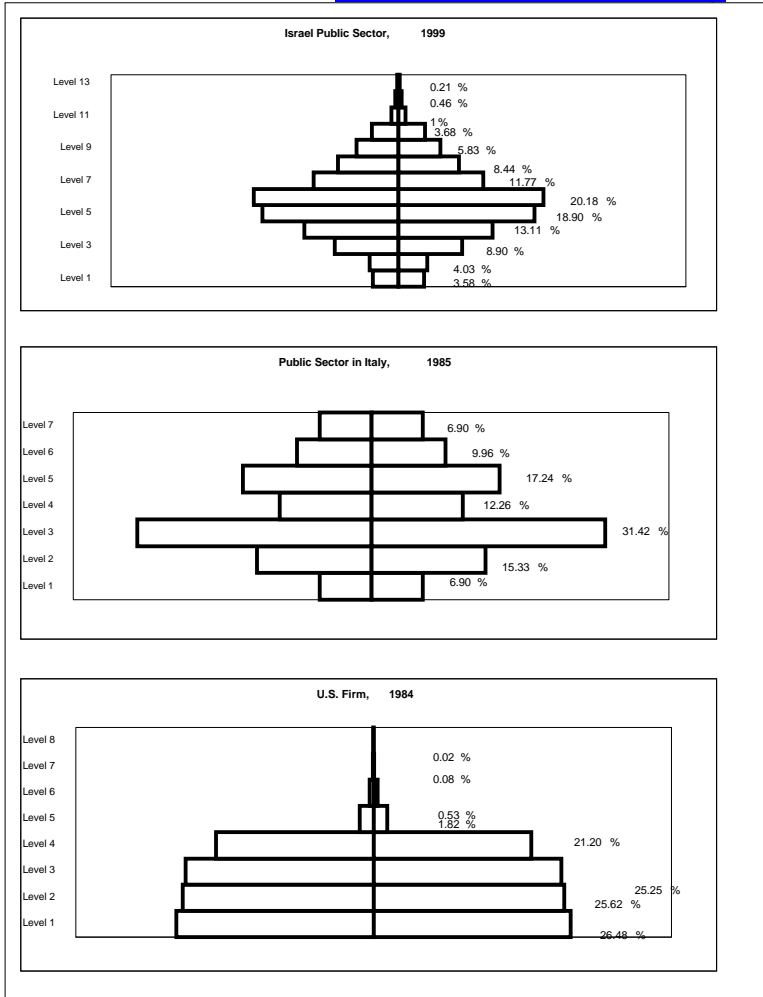


Figure 2:
Hires and Internal Appointments to Level 6 and 9 in 1992 - 99

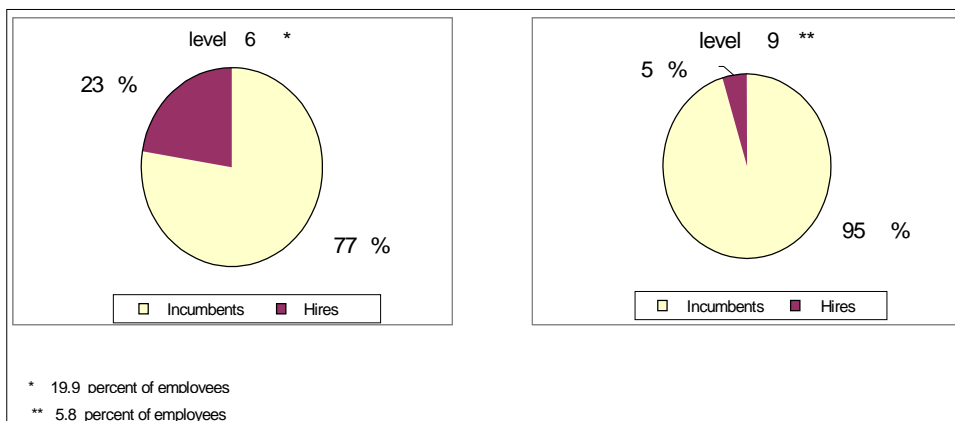


Figure 3

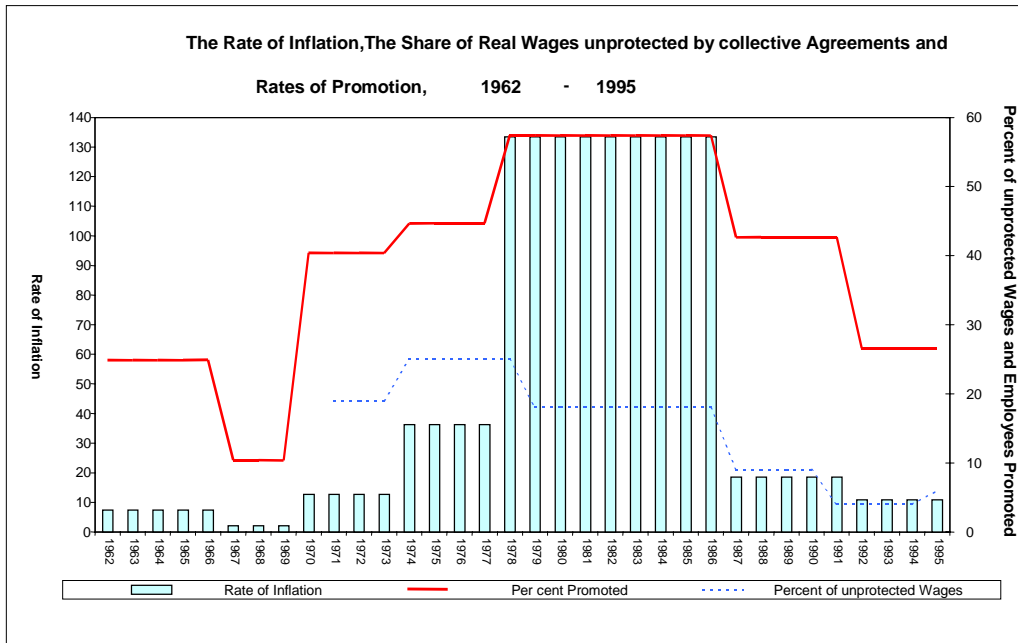


Figure 4

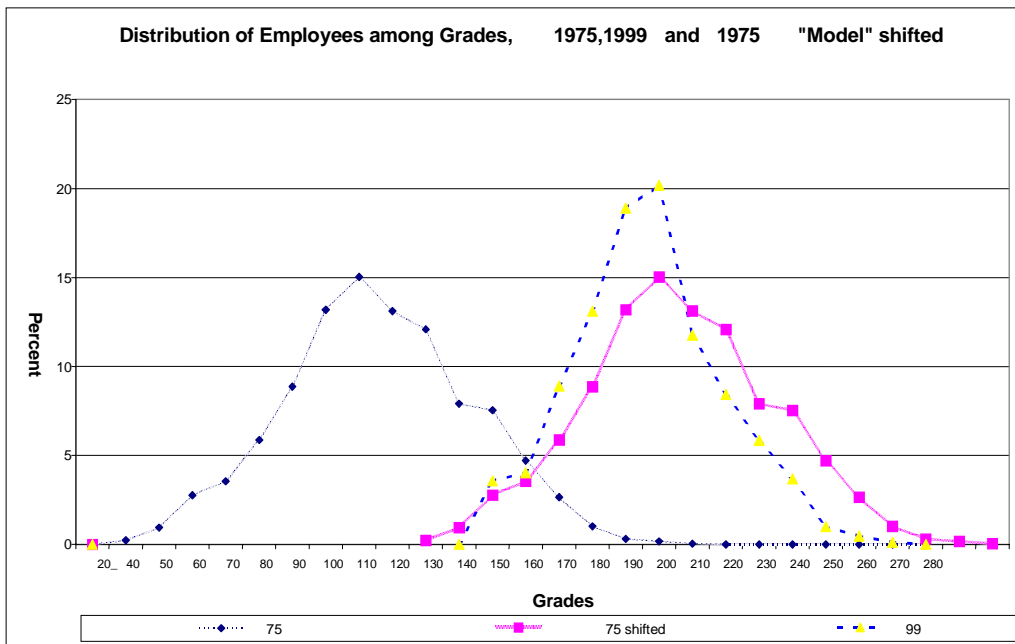
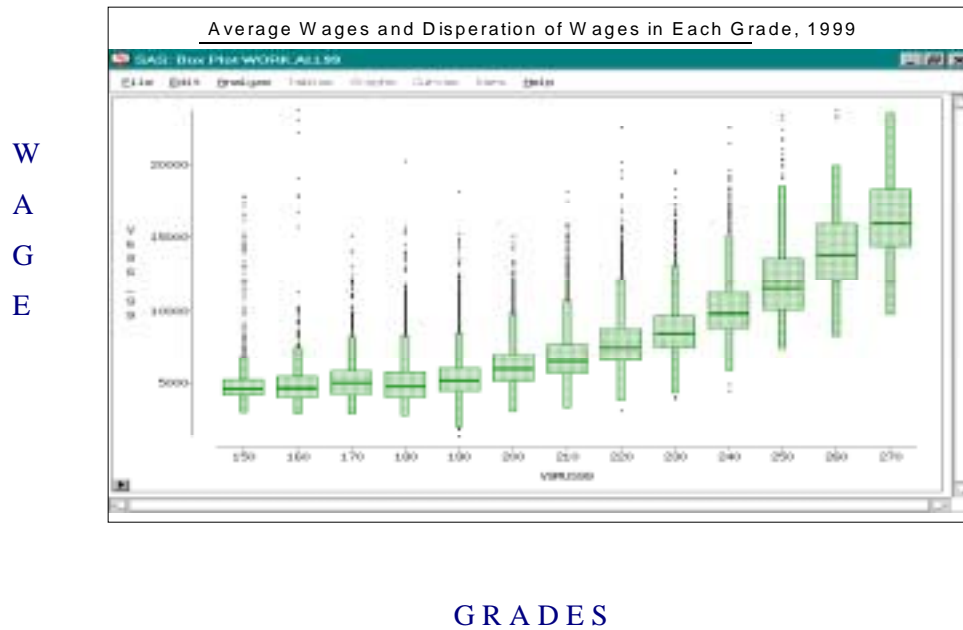


Figure 5



“Line” = average wage

“Barrel” = interquartile range

“Stick” = 10 to 90 percent of employees