

Personnel Economics

Paying for Performance

Career-based incentives

(Chapter 11)

Open Questions

- What incentives are associated with promotions?
- What kinds of promotion-systems are used?
- What are the advantages and disadvantages of standards and tournaments?
- What features determine the incentive intensity of promotion-systems?
- What is seniority pay? What incentives are generated by seniority pay?

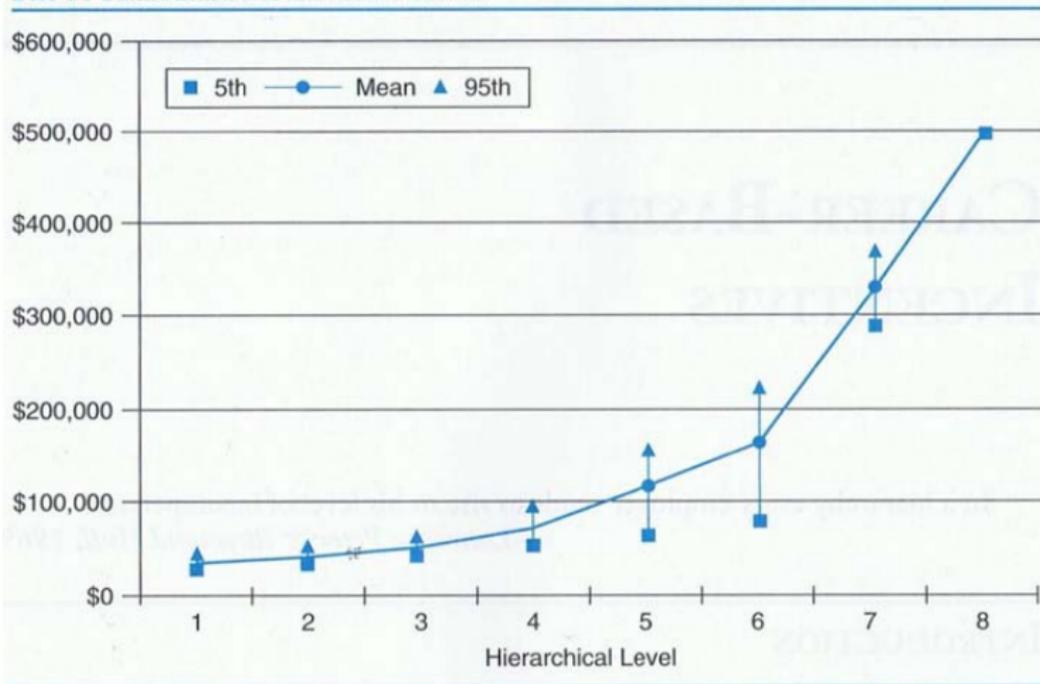
Performance-based **promotions** \implies frequently used as incentive system

- Hierarchies in firms are typically characterized by:
 - Average wages increase with positions
 - Sharp wage increases at higher levels
 - Bandwidth of wages within hierarchy levels:
 - Smaller at low levels
 - Larger at high levels
- \implies Promotions contain strong incentives

Long-term incentives and career development

Hierarchy at ACME

FIGURE 11.1
PAY BY HIERARCHICAL LEVEL AT ACME



Long-term incentives and career development

Hierarchy at ACME

TABLE 11.1
RAISE BY TYPE OF JOB TRANSITION AT ACME

<i>Level</i>	<i>% Real Salary Increase on:</i>			<i>% Difference in * Mean Pay Compared to Level Below</i>
	<i>Stay</i>	<i>Demotion</i>	<i>Promotion</i>	
1	-0.5%	-0.7%	—	—
2	-0.4	-0.2	5.1	18
3	0.1	-3.2	5.6	23
4	0.8	0.4	7.4	47
5	-0.1	0.5	8.7	64
6	0.1	—	4.5	40
7	-0.9	—	22.3	107
8	0.0	—	14.8	48
1-8	0.0%	-0.9%	5.8%	

Average increase in real salary: 0% without and 5.8% with promotion

Demotions and lateral transfers

- **Demotions** are rare because ...
 - people are promoted to their jobs only if skills are proven up-front.
 - the accumulation of human capital corresponds to promotion ladder.
 - in the case of wrong promotions people are more likely encouraged to leave the firm (mutual dismissal).
- **Lateral transfers** (change of job within level of hierarchy) are used rarely. They are used ...
 - if persons have the wrong job-match
 - to motivate employees in firms with few promotion prospects
 - to provide managers with broad experience to ease coordination

- **Promotions** as incentives

- Those who perform well are promoted to the next level of hierarchy.
- The promoted should have the greatest potential for the new job.
- **Problem** if the best in one level are not the best in the other level of hierarchy (eg. promotion of researchers to manage the R&D-department)
⇒ promotions not always suitable for incentives

- Intentional or accidental incentive system?

- Often firms have little power: promotion systems (linked to a raise) generate incentives automatically.
- Promotion signals high ability on the labor market and the market wage increases (promotion = wage increase = incentive)

Promotion-based incentives Possibilities

- **Tournament:** the best are promoted (one or several)
 - flexible with respect to firm hierarchy (depending on vacant positions)
 - career advancement not comprehensive
 - the best are not always equal (the second best in good years might be better than the best in bad years)
 - **relative performance evaluation** (only ordinal ranking necessary)
- **Standard:** those who meet a certain standard are promoted (nobody – all)
 - difficult to implement in firm hierarchy
 - individual career advancement
 - promoted satisfy a standard
 - **absolute performance evaluation** (individual evaluation for all workers needed)

Relative and absolute performance evaluation

- Ease and objectivity of evaluation
 - relative evaluation requires ordinal ranking only \implies easier
 - often easy to determine the best performer \implies more objective
- Uncontrollable risk
- Distortions

Relative and absolute performance evaluation

Uncontrollable risk

- Example: Two salespersons in Denmark and Singapore

- $PM_D = e_D + \epsilon_D + \eta$

- $PM_S = e_S + \epsilon_S + \eta$

e = effort, ϵ = local risk, η = global risk (eg. change in oil price)

- Absolute performance evaluation for standard

- PM_D and PM_S (include local and global risk)

- Relative performance evaluation (RPE) for tournament

- $RPE_D = PM_D - PM_S = e_D + \epsilon_D + \eta - e_S - \epsilon_S - \eta \implies$

- $RPE_D = (e_D - e_S) + (\epsilon_D - \epsilon_S)$

Relative and absolute performance evaluation

Uncontrollable risk

- Compare
 - RPE for tournament does not include global risk η (uncontrollable factors that influence all)
 - RPE for tournament includes local risk of others ϵ_S in RPE_D
- Result
 - Relative performance evaluation is more accurate than absolute if uncontrollable global factors (η) are more important than local factors (ϵ_D, ϵ_S) and vice versa.

Relative and absolute performance evaluation

Distortions

- Two employees A and B
 - $PM_A = e_A^P - e_B^S + \epsilon_A + \eta$
 - $PM_B = e_B^P - e_A^S + \epsilon_B + \eta$
 $e^P = \text{effort}$, $e^S = \text{effort to decrease colleague's performance (sabotage)}$
- Absolute performance evaluation for standard
 - $PM_A = e_A^P + \epsilon_A + \eta$ and $PM_B = e_B^P + \epsilon_B + \eta$
 - No incentive for sabotage
- Relative performance evaluation for tournament
 - $RPE_A = PM_A - PM_B = e_A^P - e_B^S + \epsilon_A + \eta - e_B^P + e_A^S - \epsilon_B - \eta \implies$
 $RPE_A = (e_A^P - e_B^P) + (e_A^S - e_B^S) + (\epsilon_A - \epsilon_B)$

Relative and absolute performance evaluation

Distortions

- Compare
 - With RPE the performance can either be enhanced by increasing own effort (e^P) or by decreasing others' performance (e^S).
- Result
 - Relative performance evaluation for tournament includes distortions, such as incentives to sabotage or to lobbying with the supervisor and willingness to cooperate is reduced.

Relative and absolute performance evaluation

Summary

- Relative performance evaluation
 - is easier and more objective
 - involves less measurement error because global uncontrollable risk is eliminated (macroeconomic conditions)
 - can lead to distortions (sabotage, less cooperation)
- Alternative: additional evaluation of group performance if jobs are characterized by interdependencies and cooperation is important (reduce distortions but increase in uncontrollable risk)

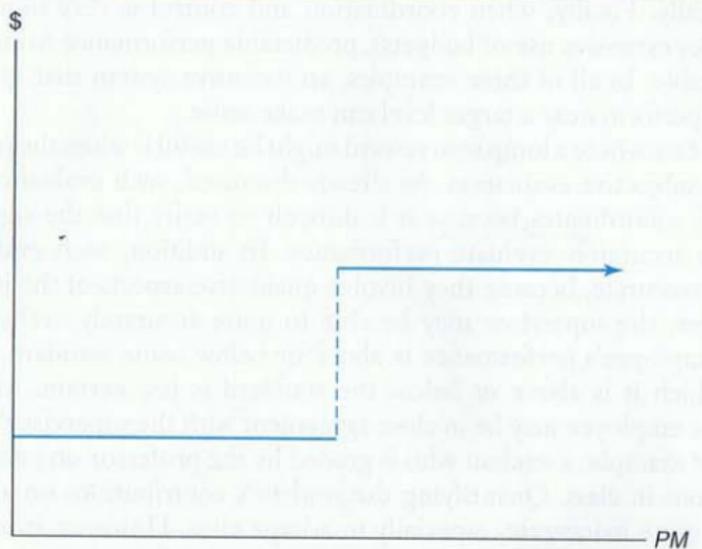
Incentive effects of promotions

- Incentives: $\frac{\Delta Pay}{\Delta e} = \frac{\Delta Pay}{\Delta PM} \cdot \frac{\Delta PM}{\Delta e}$
 - $\frac{\Delta Pay}{\Delta PM}$ raise due to increase in performance measure
 - $\frac{\Delta PM}{\Delta e}$ increase in performance measure due to more effort
- Promotions: $\frac{\Delta Pay}{\Delta e} = \Delta W \cdot \frac{\Delta pr(promoted)}{\Delta e}$
 - ΔW raise due to promotion
 - $\frac{\Delta pr(promoted)}{\Delta e}$ increase in promotion probability due to more effort
- Factors: raise + probability of promotion

Raise due to promotion $\frac{\Delta Pay}{\Delta PM}$ or ΔW

FIGURE 10.3

LUMP-SUM REWARDS



Promotion if threshold T is exceeded
(threshold is fixed with a standard and variable with a tournament)

- Raises due to promotions involve incentives (the higher the raise, the stronger the incentive)
 - W_1 wage before, W_2 wage after, $\Delta W = W_2 - W_1$
 - Two instruments: W_1 and W_2
 - Wage structure can be designed to optimize incentives
- Promotion permits the direct raise and additional raises later on \implies wages at the top end of the hierarchy can have incentive effects for many hierarchical levels below
 - Effects on the whole wage structure of the firm
 - Explains larger raises at the top end of the hierarchy (Figure 11.1)

Probability of promotion $\frac{\Delta PM}{\Delta e}$ or $\frac{\Delta pr(promoted)}{\Delta e}$

- How does effort influence the probability of a promotion?
- Extreme cases:
 - Promotion is guaranteed: $\frac{\Delta pr(promoted)}{\Delta e} = 0$
 - Promotion is impossible: $\frac{\Delta pr(promoted)}{\Delta e} = 0$
 - \implies No incentives
- Incentives are strongest, if promotions are not impossible, not too difficult and not too easy to get.
- Evidence from psychology: incentives are strongest, if workers have a 50% chance to get promoted.

Probability of promotion $\frac{\Delta PM}{\Delta e}$ or $\frac{\Delta pr(\text{promoted})}{\Delta e}$

- Luck and uncontrollable risk
 - Reduce incentives
 - Higher raises are required to compensate
 - Jobs/countries/industries with more/less uncertainty have different wage structures
- Japan and USA
 - Japanese wage structures are characterized by fewer raises (managers in the US earn relatively more than manufacturing workers compared to Japan)
 - Possible explanation: American business environment is more risky, luck and uncontrollable risk play a more important role, to ensure incentive effect, higher raises are necessary

- Those with very low and very high skills have lower incentives to increase their effort level (those far away from T)
- Subjective evaluation through supervisor (before the promotion)
 - Subjective evaluations are often distorted to sustain incentives
 - Above threshold: feedback less positive
 - Below the threshold: feedback more positive
- Persons with very low performance: no chance to get promoted, other kinds of performance-related pay necessary (eg. bonus)

- Frequently workers are recruited from outside at higher levels of the hierarchy \implies Effects?
 - Lower incentives for employees, because probability of promotion decreases (independent of effort)
- Problem with tournaments: no suitable candidates (the best are not good enough)
 - Can be circumvented in the short-run by outside hires

Incentives of promotions Turnover

- More turnover leads to more open positions at different levels in the hierarchy
- Promotions are more likely \implies stronger incentives
- Low turnover: in the long-run hierarchical changes are necessary, in the short-run insufficient opportunities, other sorts of performance-related pay useful

Difficult to observe promotion-based incentives in firms since individual measures of output mostly not available. Other sources:

- Sports
 - Larger prizes lead to better performance in sporting contests \implies athletes respond to incentives
 - Many professional sports teams have elaborated incentive schemes
- Laboratory experiments
 - Larger prizes induce greater effort
 - Greater risk induces less effort
 - Lower probability of winning induces less effort

- Tournaments and standards
 - Variance in output is higher with tournaments
 - People react to competition differently
 - Men choose tournaments more frequently than women
- Economics departments
 - Hierarchical, up-or-out promotion systems, individual performance data available (quantity and quality of published research)
 - Results:
 - Assistant professors more productive the larger the gap in pay between assistant and associate professors
 - Outside hiring is common, especially when quality of internal candidates is low (firm-specific human capital plays a minor role)

Gender differences in competitive behavior

Muriel Niederle & Lise Vesterlund (2007): *Do Women Shy Away from Competition? Do Men Compete Too Much?* The Quarterly Journal of Economics, 122(3), pp. 1067-1101.

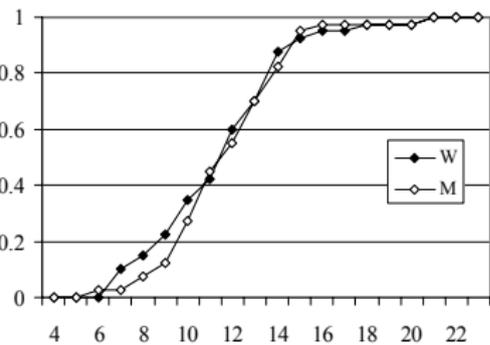
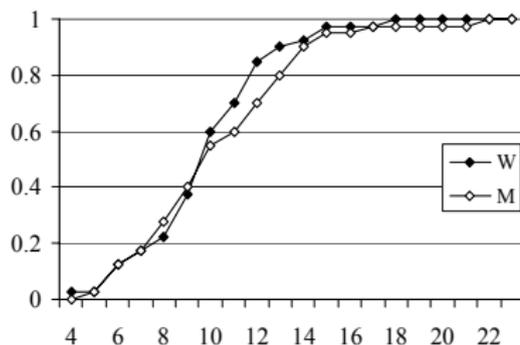
- Laboratory experiment with 80 volunteers performing a series of tasks under different compensation schemes (competitive and non-competitive).
- Tasks: correctly sum as many as possible in 5 minutes

21	35	48	29	83	
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- Groups of 4: two men and two women

Gender differences in competitive behavior

- Compensation schemes (three rounds):
 - 1 piece rate of 50 cents for each correct answer (non-competitive)
 - 2 2\$ per correct answer for winning person in group (competitive)
 - 3 participants choose compensation scheme
- Results on performance



No gender difference in performance under the non-competitive (left) and competitive (right) compensation scheme

Gender differences in competitive behavior

- Results on tournament choice
 - 73% of men and 35% of women choose the tournament
 - Tournament entry conditional on past performance:

TABLE II
PROBIT OF TOURNAMENT CHOICE IN TASK 3

	Coefficient	<i>p</i> -value
Female	-.380	.00
Tournament	.015	.41
Tournament–piece rate	.015	.50

Dependent variable: Task-3 choice of compensation scheme (1-tournament and 0-piece rate). Tournament refers to Task-2 performance, tournament–piece rate to the change in performance between Task 2 and Task 1. The table presents marginal effects of the coefficient evaluated at a man with thirteen correct answers in the tournament and twelve in the piece rate. Sample is forty women and forty men.

- Past performance does not influence tournament choice
- Women are 38%-points less likely to enter tournament

Gender differences in competitive behavior

- Possible explanations
 - Men feel more confident about their ability

TABLE IV
DISTRIBUTION OF GUESSED TOURNAMENT RANK

	Men		Women	
	Gessed rank	Incorrect guess	Gessed rank	Incorrect guess
1: Best	30	22	17	9
2	5	3	15	10
3	4	2	6	5
4: Worst	1	1	2	1
Total	40	28	40	25

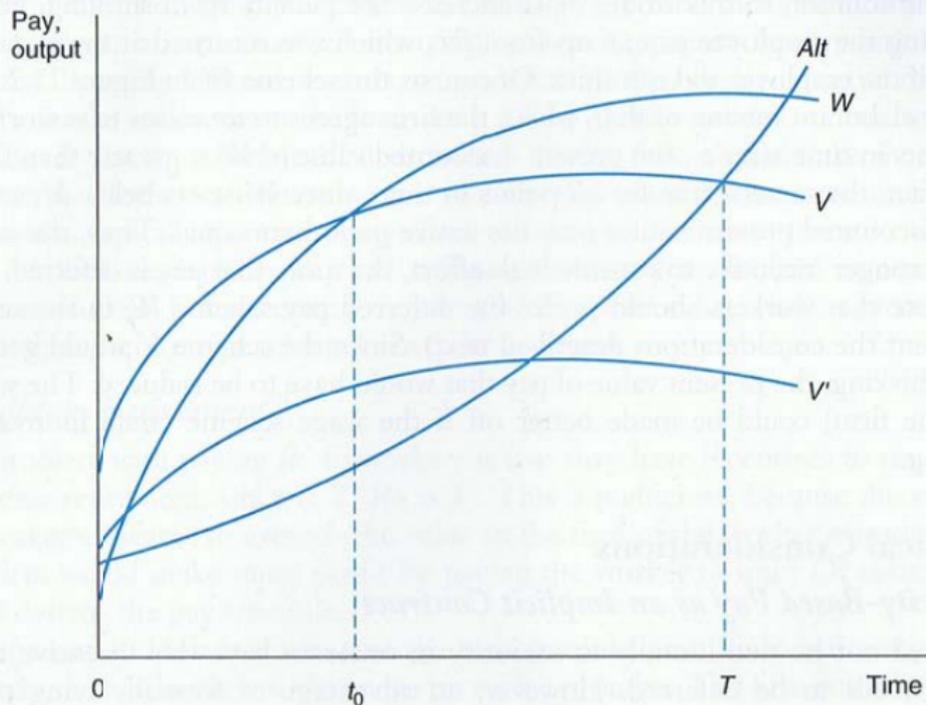
- 75 percent of men believed that they won the tournament
- Women may be more risk averse
- ⇒ Consequences for labor market outcomes of women in competitive environments

Seniority pay and incentives

- Seniority plays an important role in the compensation system
- Wages increase with age (independent of performance)
- **Seniority pay as long-term incentive**
 - Productivity with high and low level of effort: V and V'
 - High effort level would be efficient choice: difference in productivity exceeds marginal costs
 - Worker and firm would like to structure a contract in which the high effort is provided
 - Simple performance evaluation: if worker exerts low effort there is some probability that this is detected and the worker is fired
 - Value of workers alternative use of time: A/t
 - Optimal time of retirement: T
- What compensation scheme should be offered?

Seniority pay and incentives

FIGURE 11.2
PRODUCTIVITY AND PAY OVER THE CAREER



Seniority pay and incentives

- Should the firm pay V in each period?
 - Period prior to retirement: weak incentives for high effort since gap between V and A/t decreases (layoff not that bad anymore)
 - Effort decreases over time (especially if human capital is largely general and costs of finding a new job are small)
- Wage profile W
 - Discounted present value of V equals that of W up until T
 - $W < V$ prior to t_0 and $W > V$ thereafter
 - First the employee is paid below productivity and then above to sustain incentives over the career
 - Deferred compensation to tie workers to the company

Seniority pay and incentives

- Seniority pay as an implicit contract
 - Deferred pay involves a promise from the firm to the employee
 - Firm might try to lower pay or fire worker when she/he gets expensive
 - Imposes risk on worker
 - Seniority pay more often observed in older, stable firms with less risky business environments (as compared to new startups)
- The worker as lender
 - Payment is deferred and depends on the future profitability of the company
 - Workers are motivated to take into account long-term effects of their actions

Questions?