

B44: The Economics of Industrial Relations

Lecture notes 3

John Van Reenen*

Department of Economics
London School of Economics

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3 Human-resource systems (continued)

3.4 Compensation policies and internal labour markets

Reading:

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- Milgrom and Roberts, Ch. 10-13
- Borjas, Ch. 12 (incentives) and Sec. 7.9 (training)
- Bosworth et al, Ch. 18-22 and Sec. 16.4 (training)
- Polachek and Siebert, Ch. 9 and Sec. 4.4 (training)
- Some text on efficiency wages, e.g. Milgrom and Roberts, part of Ch. 8

3.4.1 Introduction

Specific investments and long-term relationships allow for a wide(r) range of compensation policies and internal-labor-market arrangements to pursue a variety of goals in a world of uncertainty and (possibly) asymmetric information

First, what are compensation policies and internal labour markets?

1. *Compensation policies* are ways of paying workers, in particular in long-term relationships. Because of the specific investments and the resulting insulation from the outside market, there is some flexibility in the way workers are compensated over the course of the relationship. For example, they may receive pay below their MRP first and above their MRP later. Firms and workers can tailor compensation schemes to provide insurance, proper incentives to invest and exert effort and stimulate (self-)selection of workers.
2. More generally, firms may employ *internal labour markets*, which are characterized by
 - (a) limited ports of entry (most employees start in some specific entry-level jobs) and limited interaction with external labour market in general;
 - (b) career paths within firms and promotions from within;
 - (c) and are typically found within large firms (because of increasing returns-to-scale in setting up internal-labour markets).

Internal labour markets provide a set of rules for selection, training and promotion through various levels of jobs.

Because of the specific investments and the resulting insulation from the outside market, there is some flexibility in the way internal labour markets are organized.

Obviously, compensation policies are an important aspect of internal labour markets

3.4.2 Overview of objectives (and instruments) of human resource policies

1. *Insurance (against bad and good days, ability risk, etcetera)*

We observe that wages are more stable than competitive (spot) labour market theory predicts. One explanation is transaction costs: a fixed (or simple linear) wage schedule is cheap to contract and enforce. It could also be a symptom of insurance.

- (a) If workers are risk-averse then they would like to minimize earnings fluctuations, i.e. they would like to insure against income fluctuations.
- (b) Such fluctuations could come about because of “idiosyncratic” shocks (bad and good days), but also more aggregate shocks to productivity (demand may temporarily fall for certain products, etcetera).
- (c) If firms are risk-neutral they may provide insurance by offering pay that is constant or fluctuates less than worker’s MRP. Workers are willing to get paid a bit less on average in return for more stable pay. So, insurance both increases profits on average and increases worker utility.
- (d) Firms will definitely be risk-neutral with respect to idiosyncratic shocks that do not affect the productivity of their total workforce, but may also be risk-neutral with respect to company-wide or even sectoral/national fluctuations if their owners have well-diversified portfolios.
- (e) The existence of specific investments and long-term relationships make it possible to pay wages that deviate from (are higher than) outside spot wages. Thus, the firm can to some extent pay time-constant wages even though outside wages fluctuate over time.
- (f) Spot labour markets without specific investments, even though they may provide some short-term insurance, cannot provide such long-term income insurance.

This story seems to work quite well, but there are a few caveats, leading to partial insurance.

- (a) First, why does the firm provide insurance to its own workers? Why don’t they get their insurance from their insurance company that also provides health insurance, homeowners insurance, etcetera?

Possible answer: Individual productivity may not only depend on shocks that are outside the control of the worker, but may also be directly affected by the worker’s effort on the job. Assuming that the

workers dislike effort, insurance would allow the worker to shirk on the job without being punished by lower wages! This is the “moral hazard” problem.

It may be easier for the firm than for an outside insurer to monitor worker performance and separate between “exogenous” shocks and choices by workers. Then, the firm may be able to provide insurance that will not be provided in the insurance market because of moral hazard.

- (b) This being said, even within a relationship it is typically still impossible to fully monitor and control worker effort. So, even risk-neutral firms will be reluctant to provide full insurance to their workers because of the disincentive effects.

This is a first example on how human resource (in this case, compensation) policies affect multiple human resources goals. They cannot be studied in isolation!

- (c) Another problem with providing, in particular, long-term insurance with incomplete contracts is opportunism (draw graph). Workers are typically eager to stay in the relationship if they get paid long-term average wages in bad times, but may be tempted to leave if they get paid the same wage in good times! So, even though specific investments and the corresponding quasi-rents to some extent isolate the relationship from outside spot market forces, these definitely put limits (without binding slavery-type contracts) on the compensation packages the firm can offer. This is a commitment problem in a world with uncertainty and incomplete contracts.
- (d) Firms may not be completely risk-neutral, because of uninsurable risks (aggregate risks that affect the entire world so-to-speak, for example large-scale rare natural disasters and wars).
- (e) The firm may also be risk-averse because of limited access to financial capital. The latter liquidity constraints may lead to bankruptcy, and loss of valuable (specific) investments, of companies that are profitable in the long term. If so, firms would prefer to reduce the bankruptcy risk by reducing wages in bad times. This is in the interest of both the worker and the firm (if there is a quasi-rent left).

Note that this problem creates an incentive for firm to lie about state of demand; union could be helpful here if more efficient monitoring; can also use strike to check whether firm is willing to hold out, which signals low opportunity cost of no production)

2. Incentives

The second objective of human resource management was already mentioned, provided proper incentives to the workers to exert efficient levels of effort.

If worker output depends on endogenous costly effort, the firm (and the worker) want to provide incentives to exert effort. Full insurance would be detrimental for efficiency in this case. Somehow, worker compensation should be positively related to their output.

If effort is observable, the firm and the worker can simply contract on effort. This does not necessarily require a contract that explicitly describes the effort required from the worker. For example, if output depends only on effort and there is no uncertainty, then effort is indirectly observable if output is observable. Then, a contract specifying the output would do the trick.

However, typically at the very best the firm observes some measure of individual output, which depends on both worker effort (observed by the worker) and some exogenous random shocks. Thus, there is asymmetric information.

Various ways to provide incentives in this situation:

- (a) piece-rates as opposed to time-rates
- (b) group-incentive pay and profit sharing
- (c) efficiency-wages (and risk of being fired)
- (d) deferred compensation (,,)
- (e) promotions and tournaments

Rest in various degrees on stability relationship: opportunism again restrict applicability (for example, with deferred compensation worker should trust that firm will indeed pay higher wage later on).

In general, providing incentives requires making pay dependent on imperfect measures of effort (for example, number of units produced in case of piece-rates). Thus, there is in general a trade-off between incentives and insurance.

Only if worker risk-neutral, optimal incentives by having worker (agent in possession of private info) bear all risk (i.e. make the worker reap all benefits from effort!).

We will go through the various incentive mechanisms in detail later.

3. *Selection*

Selection through combination of firm screening, performance reviewing and self-selection (possibly induced by compensation schemes etcetera).

Various elements of internal labour markets contribute to proper screening, for example tenure in academic departments.

Interaction with incentive schemes: for good workers it may be more attractive to e.g. participate in tournaments than for bad workers. So, tournaments provide both incentives and means to select good workers for top-level jobs.

Also, good workers may prefer piece-rates over time-rates. If you compare otherwise similar time- and piece-rate workers, you find that the latter earn more and are more productive. What is the explanation?

4. *Investment in human capital*

Compensation specified in incomplete contract should provide incentives to invest to both worker and firm. For example simple contract specifying wage above outside wage but below maximum wage acceptable to firm may entice both parties to invest ex ante. If ex post shocks are not too large, both parties want to trade ex post against contracted wage, and neither can credibly threaten to not trade (in order to renegotiate wage).

By offering a upward sloping tenure profile of wages, both insurance, incentives to exert effort and incentives to invest in specific skills are provided!

3.4.3 Compensation policies

We now discuss various compensation policies in slightly more detail.

1. *Time rates, piece rates, and more general individual incentive-pay schemes*

[See also Problem Set 4]

- (a) Time rates: fixed wage or salary per time period;
- (b) Piece rates: worker is paid fixed amount per unit of production;
- (c) More general individual incentive-pay schemes: fixed base salary plus an output-dependent performance component.

In US manufacturing 25% of workers were on individual incentive pay in the 1960s and 20% in the 1970s. In the UK, 40% of male manual workers and 30% of female manual workers were on individual incentive schemes in the 1980s. Prevalence among white-collar workers is more than twice as low. For most of these workers on incentive schemes, the incentive component of compensation amounts to less than 10–15% of total pay. So, workers are, if anything, usually paid a mix of (a lot of) base pay and (some) incentive pay. See Polachek and Siebert (1993) for these numbers.

First, note that these compensation schemes are also relevant outside long-term employment relationships. Even if you are hired for a quick temporary job (e.g. a day's work on the land of a farm), you may be paid in either of the above ways and this may affect your utility and the firm's profits.

Suppose that individual output is observed by both the firm and the worker (and can be verified in court, so that contracts can be contingent on output). Also, assume that the worker is risk-averse and the firm is risk-neutral.

We consider the following cases:

- (a) *Output only depends on chance events that are outside the control of the worker.*

We have seen that in this case it is most efficient to pay the worker a wage (time rate) that is fixed independently of actual output. This provides insurance to the worker. The worker is willing to give up some expected wage as an insurance premium, so that the firm makes higher profits (relative to the case in which it employs piece rates).

- (b) *Output depends only on worker effort and not on chance events.*

In this case, the worker chooses an effort level and given that choice neither the worker nor the firm faces risk (independently of the compensation scheme used). So, there is no need for insurance and the contract can be tailored to provide the appropriate incentives to work. Both time-rates with a contractual requirement to exert the right amount of effort and an incentive-pay contract that induces the right amount of effort can be used equivalently (because there is no uncertainty).

Example 1 *(Along the lines of Problem Set 4) Suppose the worker can choose of only two effort levels, “work” and “shirk”. If the worker works output is £100 and if the worker shirks output is £50. The worker incurs a cost of £20 if he works (and £0 if he shirks).*

In this case, it is efficient if the worker works, rather than shirks: an output gain of £50 is achieved at an effort costs of only £20. So, the firm and the worker prefer that the worker works. Because there are no information problems the worker can simply commit contractually to working and the firm and the worker only have to decide on how to divide the gains.

Suppose the worker can earn £60 net of effort costs elsewhere in the economy. Then the worker will only accept a contract that offers at least £60 net of effort costs. This is called the worker’s participation constraint. As output of a working worker with the current firm is $£100 > £60 + £20$, the worker and the firm would like to come to an agreement (this would be efficient, i.e. to their mutual benefit, as they can both be better off if they do).

If the firm can unilaterally propose a contract, it will propose a contract that induces the right amount of effort and that just entices the worker to agree. The firm will not offer more, because it will only lose profits and does not change the participation or effort decision of the worker. This is the kind of situation discussed in Problem Set 4.

In this case, the contract could either stipulate that the worker should work and is paid a fixed wage £80, or it could only specify that the worker is paid 80% of his output. The latter arrangement would pay £40 if the worker shirks and £80 if he works, so the worker would decide to work. In either case, the worker is equally happy to get

£80 for sure. Also, this £80 minus £20 effort costs just matches the net outside wage £60, so that the worker's participation constraint is satisfied.

The main ideas of the example are:

- i. Without uncertainty and observability of output, effort is effectively observed and there is no incentive problem.
 - ii. In this particular case it is efficient to work rather than shirk. That is, both the firm and the worker could be better off if the worker works. They can achieve this by either explicitly stating in the contract that the worker should work, or implicitly induce work effort through an appropriate pay scheme (the one giving is a linear piece-rate scheme, but other incentive schemes will do).
- (c) *Output depends on both chance events that are outside the control of the worker and on worker effort, but worker effort is observed (and can be contracted upon, i.e. verified in court) by both the firm and the worker (symmetric information).*

In this case, the worker and the firm can still contract on effort because of the (somewhat unrealistic) assumption that the firm can distinguish the effort and chance components of output. However, there is now also a role for insurance because there is risk. Thus, they can contract on an efficient level of output and provide full insurance to work by specifying a fixed wage (time rate).

Example 2 *Consider the previous example, but now extended with risk as in Problem Set 4. The probabilities of high and low output under shirking and working are summarized in*

output	shirk	work
	probability	
£100	1/5	4/5
£50	4/5	1/5

Unlike in the previous example, due to chance output can be low if the worker works and high if the worker shirks. Working however increases the probability of high output.

Because there are no asymmetric information problems, and therefore no incentive problems, the firm can provide full insurance to the worker by specifying a fixed wage. If it can unilaterally propose a contract, it will propose a fixed wage that just entices the worker to accept, which is £60 if the worker is told to shirk and £80 if the worker has to work. Expected profits are then $(1/5) \cdot £100 + (4/5) \cdot £50 - £60 = £0$ if the worker is asked to shirk and $(4/5) \cdot £100 + (1/5) \cdot £50 - £80 = £10$ if the contract specifies that the worker works.

Thus, the optimal contract will specify that the worker works and compensate the worker with a fixed wage £80. This solution is (Pareto)

efficient, as it provides both full insurance to the worker and induces the output-maximizing level of output.

- (d) *Output depends on both chance events that are outside the control of the worker and on worker effort, but worker effort is not observed by the firm (asymmetric information).*

In this case, the firm cannot tell whether output is low because the worker shirks or because of bad luck. The contract cannot specify effort levels and providing both full insurance and maximizing output is not feasible. Instead, there is a trade-off between insurance and incentives. If the worker is fully insured, he can shirk without consequences and will do so to avoid effort costs (moral hazard). An incentive (e.g. piece-rate) contract that induces the worker to work by making pay dependent on effort also makes pay dependent on chance and therefore offers partial insurance at most.

An optimal contract will typically offer partial insurance and incentives (dependence of pay on output) that are just sufficient to induce the worker not to shirk, unless full insurance and shirking is preferred by both parties.

Example 3 *In the example above, the firm could offer full insurance through a contract that specifies a fixed wage £60. The worker will be just willing to agree, will shirk and firm's expected profits will be £0.*

At another extreme, the firm could provide a lot of incentives by paying all output as wages, so that it pays £100 if output is high and £50 if output is low. The firm's expected profits are again £0, so the firm is indifferent between this contract and the full insurance contract.

The worker would have expected pay equal to £60 if shirking. So, the worker would prefer earning £60 in the outside market over shirking with this firm. If working with the firm, the worker would earn £90, and therefore £70 net of search costs, in expectation. Provided that the worker is not too risk-averse (for example, if utility derived from consumption x is \sqrt{x} as in Problem Set 4), it would prefer working with the firm over working in the outside market and shirking (see also Problem Set 4). Tables 1 and 2 summarize for the utility function of Problem Set 4.

Thus, in that case, this contract is "incentive compatible" in that it induces the worker to exert the warranted level of output. If the worker strictly prefers to work and stay with the firm, the contract is not optimal for the firm nor efficient from their joint perspective. First, insurance can be increased without hurting incentives by decreasing the variance of pay without changing expected pay for a working worker (efficiency). Second, expected pay can be decreased leaving some positive profit to the firm (optimality).

Table 1: Fixed wage equal to £60

worker shirks						
	output	prob.	wage	effort cost	utility	profits
high output	£100	1/5	£60	£0	$\sqrt{60} \approx 7.75$	£40
low output	£50	4/5	£60	£0	$\sqrt{60} \approx 7.75$	-£10
expected	£60		£60	£0	$\sqrt{60} \approx 7.75$	£0
worker works						
	output	prob.	wage	effort cost	utility	profits
high output	£100	4/5	£60	£20	$\sqrt{40} \approx 6.32$	£40
low output	£50	1/5	£60	£20	$\sqrt{40} \approx 6.32$	-£10
expected	£90		£60	£20	$\sqrt{40} \approx 6.32$	£30

Table 2: Wage equal to actual output

worker shirks						
	output	prob.	wage	effort cost	utility	profits
high output	£100	1/5	£100	£0	$\sqrt{100} \approx 10.0$	£0
low output	£50	4/5	£50	£0	$\sqrt{50} \approx 7.07$	£0
expected	£60		£60	£0	≈ 7.66	£0
worker works						
	output	prob.	wage	effort cost	utility	profits
high output	£100	4/5	£100	£20	$\sqrt{80} \approx 8.94$	£0
low output	£50	1/5	£50	£20	$\sqrt{30} \approx 5.48$	£0
expected	£90		£90	£20	≈ 8.25	£0

Problem Set 4 provides a more worked-out example. We will not formally derive efficient/optimal contracts. A C-level course at UCL exists that rigorously and much more extensively discusses this and other models of information.

In the most realistic case (*d*) of asymmetric information, there is a tradeoff between insurance and incentives. In general, under asymmetric information a solution as efficient as the symmetric information solution (with full insurance) cannot be obtained. Some risk has to be borne by the risk-averse worker to elicit proper work effort.

In Problem Set 4, an example is also given of the possible selection effects induced by the choice of contract in the case that workers are heterogeneous and that firm's cannot distinguish between workers of different types. Loosely, lazy workers are less attracted to piece-rate contracts and more to time-rate contracts. Normal, or very able, workers prefer incentive-pay. Thus, by offering incentive-pay schemes like piece-rates, the firm can try to attract (only) normal, able workers.

In the problem set an example is given of a so called “menu of contracts”. The firm can offer the worker a choice of a variety of contracts, for example a time-rate and a piece-rate contract. If well-designed, different workers (lazy and normal) will choose different contracts and thus reveal their type! Thus, menus of contracts are useful tools for selection.

Empirically, this causes interpretational problems. It can be shown that workers on piece-rate contracts are on average 15%-35% more productive than otherwise similar workers on time-rate contracts. You would like to ascribe this effect to the incentives provided by piece-rate contracts. However, we have just seen that more able (and less lazy) people are more likely to select jobs that offer piece-rate pay. Thus, the measured 15%-35% productivity gap confounds incentive and selection effects.

One problem with menus of contracts in a dynamic setting is that the firm designs its menu without knowing the type of working it is dealing with. Once the worker has revealed his type, the contract offered may not be the best option for the firm anymore. If the firm is not committed to sticking to the contract originally offered, it may propose another contract to the worker (who is now of a known type) that yields higher profits. Foreseeing this lack of commitment, the worker may not choose the contract he really wants in the first place. This is called the “ratchet” effect.

So far, we have seen that even very simple compensation schemes may play their part in insurance, providing incentives and selecting workers. It should come as no surprise that also the fourth objective of human-resources management, providing proper incentives for investment in human capital, may be affected.

Example 4 Effects on human-capital investment *Two-period relationship; forget about insurance, incentives and discounting first.*

- (a) *First-period productivity/outside wage: $w_0 = £10$.*
- (b) *Second-period expected outside wage is also $w_0 = £10$. First-period investments of £1 by both firm and worker turn the expected productivity in period 2 into $w_0 + £5 = £15$.*
- (c) *Fixed second-period wage w_0 : worker does not invest*
Second-period wage $w_0 + 0.5(\text{output} - w_0)$: worker’s expected pay £12.5;
firm’s expected profits £2.5 compensate for investment (no credible threat to withdraw in second period; invest in first period)

With risk-averse workers this loads risk on the worker. Alternative is to write fixed wage contract that specifies a fixed £12.5 wage in the second period (but at will, etcetera). If they invest, same situation arises (limits to effects opportunism because of quasi-rent). If worker does not invest, firm can credibly threaten to fire worker and contract will be renegotiated down to outside wage. Thus, worker and firm will have incentive to invest.

Individual incentive contracts (and piece-rate schemes) are simple and effective ways of providing incentives to workers:

- (a) simple and easily understood;
- (b) provide strong incentives to exert effort and increase productivity;
- (c) self-selection of able and hard-working workers;
- (d) stimulates human-capital investment (consideration in long-term relationship);
- (e) no costly performance reviews;
- (f) based on objective measures of performance (avoids favoritism, manipulation).

However, disadvantages of piece-rate systems/individual incentives schemes:

- (a) Constrained by risk-aversion of workers (flip-side of providing incentives);
- (b) Individual output may be hard to define unambiguously (not so objective after all);
- (c) Workers may have little control over their own output (for example if part of an assembly line);
- (d) Workers may shift attention from quality to quantity if only quantity is rewarded (more general point about providing incentives with multi-dimensional effort). This introduces the need for (costly) quality inspections. Holding workers responsible for quality loads risk on worker. Also, workers may neglect maintenance of machines, helping their co-workers etcetera. See also the Lincoln Electric example in MR.

To some extent, these adverse effects can be mitigated in long-term relationships, for example by stable job assignments (need to maintain your own machine; co-dependence on co-workers).

You would expect that piece-rates are more likely to be observed in jobs where

- (a) individual output is easy to define,
- (b) effort is hard to measure directly,
- (c) workers have a lot of control over their output and
- (d) quality is easy to monitor .

For example, sales commissions are less prevalent in large department stores than for door-to-door sales persons. Obviously, effort is easier to monitor for the first class of workers. Also, Borjas: footwear/shirts versus industrial chemicals.

One problem in implementing individual incentive schemes is that it may be hard to measure the relevant parameters that feed into the firm's decision problem (effect of individual effort on measure of output, effort costs, etcetera). This leads to various instances of the ratchet effect. Workers have incentive to pretend their task is hard when standards are set. They may have similar incentives if standards (piece rates) are often reviewed in practice (example: Soviet central-planning system). Commitment problem. Similarly, firm may try to lower pay by claiming conditions are bad.

2. *Group incentive-pay and profit sharing*

- (a) *Profit-sharing* used by 30% of US companies in 1988, but perhaps only 1% of employee income from profit-sharing (MR).

Extreme form is employee-ownership of firm (e.g. partnerships in law, consultancy, etcetera).

- (b) *Gain-sharing*: group-bonuses for reaching certain (output, quality, etcetera) targets.

Why group incentives rather than individual incentives? (Closely linked to disadvantages piece-rate scheme)

- (a) Individual contributions output hard to measure (design team)
- (b) Groups of workers may have better information than management. Group-incentives then stimulate monitoring within group.
- (c) Maybe easier to implement changes if they benefit group as whole.
- (d) Group-incentives stimulate co-operation, which may be productivity-enhancing.
- (e) Group may be better able to change production methods etcetera in response incentives.
- (f) Better risk-sharing (within groups).

What group size? See MR.

Fairness issues. See MR.

3. *Efficiency wages*

Shapiro-Stiglitz model (e.g. MR 8 p. 250-; Borjas Sec. 12.5).

Idea: pay $w > w_0$, monitor worker and fire worker if found shirking. Requires quasi-rents (to allow $w > w_0$), for example due to search/unemployment. Interacts with internal labour markets: Japanese system with low-level hiring only.

Some evidence:

- (a) (Borjas) 10% higher wages reduces dismissals for disciplinary reasons by 5%.

- (b) (Borjas) Huge wage differentials, in particular between industries. Could be compensating differentials for job characteristics or worker traits. Mixed evidence.
- (c) (Polachek and Siebert) 8% higher wages in UK plants with > 1000 employees relative to plants with ≤ 100 employees.

Advantages of efficiency-wages over direct incentive pay:

- (a) Incentive-pay schemes may not be feasible, for example if worker cannot survive a period of low pay (liquidity constraints on worker).
- (b) Efficiency wage schemes can use subjective evaluations in a way that direct incentive pay schemes cannot. With direct performance pay, the firm has an incentive to underrate the worker's performance in a subjective evaluation so that she has to be paid less. With efficiency wages, the only option is to fire the worker, or keep the worker at a fixed wage (independent of the review). The employer has no incentive to underrate the worker, as he would be firing a perfectly fine worker that brings in profits.

For simplicity, suppose one period model. Worker only gets paid outside wage w_0 if found shirking.

- (a) Outside wage w_0 .
- (b) Inside wage $w > w_0$.
- (c) Probability of monitoring (and detection of shirking) p .
- (d) Cost c of exerting effort (working).
- (e) Worker works if $u(w - c) \geq (1 - p)u(w) + pu(w_0)$.
The wage w_e such that $u(w_e - c) = (1 - p)u(w_e) + pu(w_0)$ is the "efficiency wage" that just induces the worker to work.
- (f) Note that $w_e - c \geq w_0$, so that the worker participation constraint is always satisfied. We have to check though that the firm finds it worthwhile to pay efficiency wages (monitoring cost?).

For example, if the worker is risk-neutral (linear utility), then

- (a) worker works if $w \geq w_0 + c/p$ and $w_e = w_0 + c/p \geq w_0 + c$ is the efficiency wage.
- (b) w_e increases if c increases or p decreases. Thus, there is a trade-off between monitoring cost (that is, establishing higher p is more costly) and the level of efficiency wages. More extensive model would explicitly model choice of p for given monitoring technology (cost). See MR.

In earlier numerical example, $w_0 = \text{£}60$ and expected profits would be zero if $w = w_0$. Suppose that $p = 4/5$. The efficiency wage $w_e = \text{£}60 + (5/4)\text{£}20 = \text{£}85$ would induce the worker to work and deliver expected profits $\text{£}5$ (but, monitoring cost?).

If worker risk-averse, the efficiency wage can be lower, as there is only risk if the worker shirks. For example, with the preferences of the numerical example, a wage of $\text{£}85$ would give utility $\sqrt{85 - 20} \approx 8.06$ if working and $(1/5)\sqrt{85} + (4/5)\sqrt{60} \approx 8.04$ if shirking.

This model is extremely stylized in not explicitly dealing with dynamics. Efficiency wages are more effective in long-term relationship in which firing because of shirking interrupts a stream of high wages.

Note that efficiency wages typically limits turnover, and may have insurance, selection and HC effects.

Efficiency wage theory is typically discussed as a theory of *involuntary unemployment*. The quasi-rent arises because separated workers have to live through a spell of unemployment. The unemployed at any point in time would strictly prefer to work at the efficiency wage.

Criticism of efficiency wage theory: unless quasi-rent due to specific investment (search, HC, switching cost), unemployed have incentive to underbid incumbent workers by offering entrance fee/posting bond (up to the point they are indifferent). This may seem like a bribery story, but is really a deferred compensation story.

4. *Deferred compensation*

As noted in efficiency-wage context, in long-term relationships shirking worker typically runs risks of getting fired and losing *future* wages.

Increasing wages over tenure (deferred compensation) can further increase such incentives (and may reduce turnover, reward HC investment, lead to selection and provide insurance).

It is sometimes said that the worker “posts a bond” that gets repaid over the course of the relationship. This is related to the “golden handcuffs” discussion in MR.

Note that deferred compensation is, like all truly long-term arrangements, particularly vulnerable to opportunism/firm moral hazard. Firm has incentive to fire worker (or induce the worker to quit) before the bond has to be repaid. With sufficiently large quasi-rents, this may not be a huge problem. Also, firm may be long-lived and worry about its reputation with future employees.

3.4.4 Internal labour markets, promotions, tournaments

1. Within large firms, we typically find *internal labour markets*, which are characterized by

- (a) long-term relationships
 - (b) limited ports of entry and limited interaction with external labour market in general;
 - (c) career paths within firms and promotions from within;
2. Often, wages are attached to jobs/job classifications rather than individuals.

Incentives can then be provided through performance-based promotions through a sequence of jobs.

This requires commitment to an internal labour market by the firm.

3. This may interact/conflict with other objectives of internal labour markets, like the selection of the right worker for the right job and human capital accumulation.

It may be easier to collect information on workers within the firm than on outsiders, so that careers within internal labour markets may be the efficient way of selecting managers.

Higher level positions may require specific skills that can only be acquired on-the-job within the firm.

4. Promotions can be based on (often subjective) absolute performance evaluation, but also on relative performance evaluations, *tournaments*.

Note that pay should rise even if task in new job not more complex (because of selection of better workers).

For simple formal model of tournaments (Lazear and Rosen), see PS, Sec. 9.4.

5. *Some disadvantages of promotions/tournaments as an incentive device*

- (a) Very blunt relative to performance pay, etcetera.
- (b) Cannot be used at top: if promotion is only incentive scheme, those at the top drink coffee all day. Other incentives have to be given to managers.
- (c) Competition between workers may be counterproductive (sabotage).
- (d) Misassignment of workers to jobs may result. System may be such that everyone is “promoted to his level of incompetence”. Also, best salesman may not be best manager.

6. *Some advantages of tournaments as an incentive device*

- (a) evaluation costs (only measure of *relative* performance required at a few points in time);
- (b) gets rid of common error in performance;

(c) with fixed prize, no room for managers/owners to cheat.

7. MR 12 describe some human-resource systems, which you can and should study:

(a) Hierarchy of jobs plus entry position, with, for each job level, a pay level, minimum standards and (higher) promotion standards.

Incentives and selection come together as discussed before.

(b) If different skills needed on different levels, mix of incentive pay and promotions can be answer.

(c) Up-or-out and tenure.

We have discussed tenure before (e.g. providing proper incentives in selection of new workers).

Combination with up-or-out useful to take away possibility to delay tenure in order to capture more rents.

[This last part on features of internal labour markets was rather sketchy. I do expect you to study these issues in the reading, notably Milgrom and Roberts (1992), Ch. 11.]

The role of trade unions

Reading:

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- Booth (1995), Sec. 3.2.3 and 3.3; Ch. 7.
- The other references on unions (notably, Freeman and Medoff, 1984) provide additional material.

[The organisation theories discussed in e.g. Booth link unions to the human resources theory discussed so far.]

Empirical analysis of human-resource systems and unions

Reading:

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- Booth (1995), Ch. 7.
- Bits and pieces scattered throughout the other texts.