Lesson 4: Deferred Compensation and Seniority.

In this part of the course we begin to study incentives in jobs where workers aren't paid a commission or piece rate. Most jobs are like this: a worker is paid a certain amount simply to be on the job for an hour, week or month. For simplicity we will ignore for now the possibility that working hard in such a job will win you a promotion (we'll get to this in the "tournaments" section of the course), so think of hourly or salaried workers in "dead-end" jobs where the possibility of promotion is remote. We will make the following points about incentives in these jobs:

1. The threat of dismissal as an incentive. Even though there are no explicit incentives in jobs like this, there is one important, implicit incentive: the threat of being fired if performance is observed to fall below some threshold.

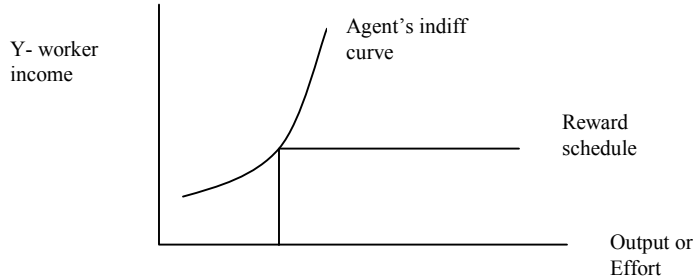
2. Sometimes (for example when worker "shirking" is hard to detect or when the potential gains from trade between worker and firm are low) **the threat of dismissal isn't enough** to prevent shirking. If both workers and firms anticipate this, mutually-profitable exchanges between workers and firms can fail to occur, i.e. there is Pareto-inefficiency.

3. Two alternative **ways to increase the effectiveness of the dismissal threat**, and thereby restore efficiency, are **worker bonding** and **deferred compensation**.
In the latter case, workers' wages will be automatically indexed to rise with seniority (i.e. with how long they've been with the firm) even though there are no increases in productivity or worker performance as workers age.

4. **Deferred-compensation schemes** (where younger workers in the firm are underpaid relative to their productivity and older workers are overpaid) **distort workers' retirement incentives.** In order to be effective, they must therefore be combined with a **mandatory retirement** agreement, or with a pension plan that is carefully designed to induce retirement at the "efficient" age.

In more detail:

1. Dismissal Threats as an Incentive. We've already considered this, when we characterized the reward schedule facing workers at Safelite Glass before the piece rate was introduced. It is a step function, rising from zero to a positive level at the minimally-acceptable output level. Thus, we do not expect workers paid on an hourly basis with no prospect of promotion to supply zero effort; we expect they will supply just enough effort to keep their jobs.



2. An example of when the threat of dismissal isn't "enough" to achieve efficiency.

Example Worker's Effort Decision: -shirk/no shirk
-if shirks→no effort→no output
-Probability of detection p=1
-shirking is worth $50,000
-shirking is detected in the middle of the year
-firm's policy is dismissing all shirkers

In general the worker balances:

Remaining PVU No Shirks(t=i)=Wage(t=i)+...+Wage(t=2)+...+Wage(t=T)

vs.

Remaining PVUShirks(t=i)=50[1] *+.5*{Wage(t=i)+AltWage(t=i)}*[2]
+AltWage(t=i+1)+....+AltWage(t=T)

A Three-Period Example:

Time	Production	Wage	Alt Wage[3]	Remaining PVU No Shirks	Remaining PVU If Shirks
1	100	100	70	300	50+.5(100+70)+140=275
2	100	100	70	200	50+.5(100+70)+70=205
3	100	100	70	100	50+.5(100+70)=135

*Note that in periods 2 and 3 the worker is better off by shirking.

So, what will actually happen here?

Suppose the firm actually hired the worker in period 1. Then the worker will not shirk in period one, but will be tempted to do so in period 2. If he shirks then, he will be dismissed and his total lifetime utility will end up being: 100 + 50 + .5(100+70) + 70 = 305. The firm's total profit from employing the worker will be (100-100) + (0-50) = *minus* 50.

If the worker is *really* smart however he will wait until period 3 to shirk. Then his total lifetime utility will be 100 + 100 + 50 + .5(100-70) = 335. The firm's profits will again be minus 50.

In either case, anticipating that workers will eventually shirk, will the firm agree to hire the worker in period 1 after all? Of course not. So a deal is never made and the worker

[1] Utility from shirking
[2] Shirking is detected at the middle of the year
[3] Productivity in alternative job is less than at actual job

spends his whole career in the alternative firm, producing and earning only 70 per year rather than the 100 he would earn if he could somehow *credibly* commit to the original firm that he won't shirk in the future. Valuable potential gains from trade are lost: there is Pareto-inefficiency. Both the firm and the worker want to ensure commitment; the problem is that the threat of dismissal is not a strong enough incentive to achieve it.

3. Bonding and Deferred Compensation as Solutions to the Commitment Problem.

Case 1: Bonding. The worker posts a bond of X dollars before starting to work for the firm, then he gets it back at the end of the contract if he does not shirk.

Time	Production	Wage	Alt Wage	Remaining PVU No Shirks	Remaining PVU If Shirks
Start	0	-50	0		
1	100	100	70	300	225
2	100	100	70	200	155
3	100	100	70	100	85
End	0	50	0		

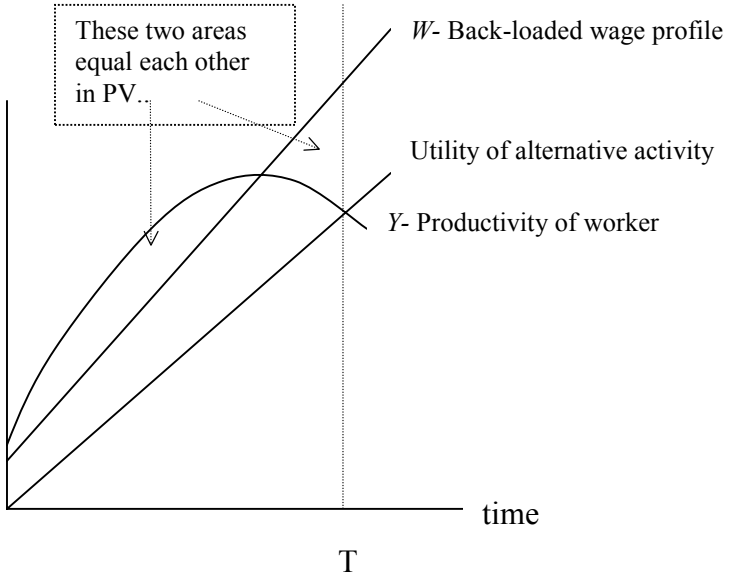
Note that we have assumed a bond of 50, but in fact any bond above 35 will work in this example.

Case 2 Deferred Compensation. Sometimes workers don't have the cash to post a bond "up front". In this case the firm can offer to "take the bond out of the worker's starting wages". Essentially, the firm underpays workers when they are young and pays them back when they are older.

Time	Production	Wage	Alt Wage	Remaining PVU No Shirks	Remaining PVU If Shirks
1	100	20	70	300	235
2	100	100	70	280	205
3	100	180	70	180	175

4. Deferred Compensation and the Retirement Decision.

To see the problem, consider a more general case of deferred compensation diagrammatically:



Under a "back-loaded" wage profile you underpay the worker at the beginning of her career and over pay her in the later part. The present value (areas under the curves *W* and *Y*) are the same either if you pay the worker her productivity each period or if you pay her a back-loaded wage profile up to time T.
If the worker gets paid her productivity each period she will want to retire at time T. The problem is that under *W* the worker will not want to retire at time T (she is making more money then she values the alternative use of time), hence you need Mandatory Retirement.

Workers will not want to retire at the efficient age. Since wages are higher than productivity towards the end of the career, wages send the wrong signal to workers. Hence you need Mandatory Retirement, that is part of an efficient labor contract. The Pareto Optimal contract can involve:

a) Mandatory Retirement
b) Hours/overtime restrictions (overtime limits for old workers, mandatory overtime for young)

Note however that mandatory retirement is illegal in the U.S. It is also illegal to cut wages at a given age, say 65 (the case against it is age discrimination). So what can the firm do?

- The firm can structure a pension compensation to induce retirement at any age.
- The firm can also offer buyouts, but the wrong people may take them.

Final Issues:
- Efficiency wages
- firm and workers' reputation
- bonding for quits
- workers' preferences for increasing wage profiles
- imperfect detection

Efficiency Wages: Another alternative to deferred compensation to prevent shirking is just to pay higher wages throughout the worker's career. If this induces enough extra effort, it may pay for itself. Henry Ford as an example? Also note the evidence on efficiency wages from the modern auto industry (Cappelli).

Firm Reputation: Deferred compensation only works when workers can trust firms to:
-still be around, don't sell out before the "bond" is paid back
-not misrepresent reasons for terminating workers
(note when we talked about specific human capital, we took this problem seriously –that is why the worker would not be willing to pay for all his/her training. By arguing that the firm will overpay its older workers we are now arguing that the firm can make promises and stick to them).

Worker Reputation: If other firms find out you shirked, the original firm may not have to offer as large a wage premium to prevent you from shirking.

Bonding/Deferred Compensation to Prevent Quits: We have developed the argument that deferred compensation can prevent shirking. But by the same token it can reduce workers' voluntary turnover rate. One of the best examples of this is employee stock options, which typically do not vest until the worker has remained with the firm for a certain amount of time.

Employee Preferences for Increasing Wage Profiles: Will workers be reluctant to defer so much of their compensation? Perhaps surprisingly, there is some evidence that workers actually *prefer* increasing wage profiles with **lower** present value than flat ones! (Loewenstein and Sicherman article).

A final note on imperfect detection:

When: - monitoring is costly
- either workers are risk neutral OR "convicting the innocent" is not a significant problem

The optimal policy is a very large penalty combined with very little monitoring.

Why? In general, to prevent shirking the firm must establish a punishment/monitoring scheme that satisfise the following condition:

$$E(\text{Penalty from shirking}) > \text{Worker's gain from shirking}$$

Example: Assume the worker shirks by sleeping on the job (and he values the utility gain from shirking at $50). Then he will not shirk as long as:

$$E(\text{Penalty from shirking}) = \text{Prob(Caught)} * \text{Penalty} > 50$$

Consider the following options:

a) p=1 and F=50
b) p=.5 and F=100
c) p=.001 and F=50,000

All three prevent shirking but the last is cheapest to implement.

More generally the principal's problem is $\text{Min}_{p,F}\ C(p)$ *s.t.* $p*F \geq 50$

Then: F=50/p

It follows immediately that the optimal policy is to let $p \to 0$ and $F \to \infty$
Practical issues are (a) employee risk aversion (only if mistakes are possible)
(b) the biggest F any firm can impose is dismissal.