Salari d'Efficienza

1. Come ci può essere disoccupazione involontaria

Si ha disoccupazione involontaria quando esiste un lavoratore, un impresa, e un disoccupato pronto e capace di fare lo stesso lavoro che fa il lavoratore per un salario un po' minore di quello attualmente pagato al lavoratore. Si vede dalla definizione che la disoccupazione involontaria crea problemi per la teoria economica neoclassica standard perché pare che due agenti -- il datore di lavoro e il disoccupato -- possano giovare a entrambi a spese del terzo -- il lavoratore occupato, e invece non lo fanno. Perché? Non stiamo esattamente domandandoci perché non ci sono posti di lavoro per i disoccupati. Anche se per chiarire le idee supponessimo che il numero di posti di lavoro fosse fisso e non dipendesse dal salario rimarrebbe la domanda "perche' i salari non scendono, fino a che i disoccupati non sono tutti disoccupati volontari?"

2) Chi e' responsabile? Alcune teorie sostengono che i colpevoli sono i lavoratori occupati (sono i modelli insider-outsider che tratteremo nella lezione prossima). Altre sostengono che la colpa e' del disoccupato, che in realtà non vuole davvero lavorare (il che significa dire che la disoccupazione involontaria in realtà non esiste) oppure che la ricerca di lavoro e' troppo costosa Più strano dal punto di vista teorico si può sostenere che e' il datore di lavoro che non vuole pagare un salario più basso, e questo e' quello di cui parleremo oggi.

Un modello generico di salari d'Efficienza

Un'impresa che sceglie w e L per massimizzare profitti
1) Max $\pi = F(e(w)L) - wL$
$F'()>0$, $F''()<0$.

Supponiamo che i lavoratori hanno una possibilità alternativa che vale
$\underline{w}$. Quindi il vincolo per la scelta di L e w derivato dall'offerta di
lavoro è $w=\underline{w}$. Se questo vincolo non è stringente l'impresa sceglierà w
e L che soddisfano le condizioni di primo ordine

2) $F'(e(w)L)e'(w)L - L = 0$

e

3) $F'(e(w)L)e(w)-W = 0$

Quindi

4) $e'(w)w/e(w)=1$.

Chiamiamo w che soddisfa 4 w*. Se $w^* > \underline{w}$ c'è disoccupazione
involontaria.

5 tipi di modelli di salario di efficienza

1. Biologico
2. Turnover (dimissioni)
3. Azzardo Morale
4 Selezione avversa
5. Sociologico (scambio di regali parziale, senso di equità).

Un modello di salari di efficienza basato sulle dimissioni

L'impresa deve pagare k per addestrare un lavoratore (incluso il salario pagato durante il periodo di addestramento).

Poi i lavoratori si dimettono con probabilità $1-H(W)$
(cioè la probabilità che il salario di riserva $\underline{W}$ (nel libro W_a) è minore di W è $H(W)$).

L'impresa assume L lavoratori di qui lambda non si dimettono dopo l'addestramento.

lambda = LH(W)

Poi c'è la funzione di produzione F e il prezzo del prodotto
p = 1.
 L'impresa sceglie W e L per massimizzare

π = F(lambda) − w − kL = F(L(H(W)) − WLH(W) − kL

Massimizzare i profitti richiede di minimizzare il costo per lavoratore che rimane

Min c(W) = (Wlambda +kL)/Λ = W + (k/H(W))

discussing efficiency wages, I will assume that firms declare a wage offer and workers decide whether to accept the job at that wage or not. It seems obvious that if wages are set this way there should be no involuntary unemployment; firms would lower the wage so long as there were unemployed workers willing to take the job at the current wage. According to efficiency wage theories however,even if there is involuntary unemployment, firms choose not to reduce the wage they offer, because if they reduce the wage the productivity of their workers declines. This means that it costs the firm less get the same amount done by hiring few workers and paying them a lot than by hiring many workers and paying them little.

A simple model without much content can illustrate this. Assume the firm's profit is given by equation 1

1) profit = f(e(w)L) – wL

with $f' > 0, f'' < 0$. The firm chooses L and W to maximize 1 subject to the constraint that if it offers too low a wage it can't get as many workers as it wants. For simplicity assume that each worker has alternative opportunities worth $\underline{w}$ so long as w is greater than $\underline{w}$ this constraint is not binding and can be ignored. Assuming the labour supply constraint is not binding on the firm it chooses W and L which satisfy the first order conditions

2) f'(e(w)L)e'(w)L – L = 0
and
3) f'(e(w)L)e(w) – w = 0
so
4) e'(w)w/e(w) = 1

if the wage described by 4 (w^*) is less than $\underline{w}$ then the firm will have to pay $\underline{w}$. If the wage described by 4 (w^*) is greater than $\underline{w}$ then the firm will pay w^* even though it could attract as many workers as it wanted to at a slightly lower wage. In other words the firm chooses a wage higher than the market clearing wage. If the many workers the firm could attract are unemployed, this is an illustration of the fact that if productivity is increased by increased wages, involuntary unemployment can exist even if firms are free to set wages. If they have other lower wage jobs, then the model is an illustration of the possibility that identical workers can have different wages.

There are at least 5 different efficiency wage models: biological, work/shirk, turnover, adverse selection and morale. The first to be described was the biological efficiency wage model which applies only if the market clearing wage is so low that workers paid that little are malnourished and can't work well. It is not in the firms interests to have starving workers even if the alternative is so bad that workers will accept starvation wages. Clearly this model is not relevant to developed countries.

The most thoroughly discussed model of efficiency wages is the work/shirk model in which firms pay a higher than market clearing wage so that workers will fear being fired and so will actually do what they are supposed to do. If workers were paid

exactly the minimum amount required to keep them form quitting, then they would view the threat of being fired with indifference. Without fear they would not work as hard as the firm would wish, might be careless and might pilfer (steal things). All these activities are called shirking. It may be necessary to the firm to maintain a positive cost of job loss for its workers in order to induce them to actually work. The cost of losing a job depends on the wage paid, the wage paid in alternative jobs, the income received when unemployed and the chance of getting one of the alternative jobs if fired for shirking. If monitoring is perfect i.e. if firms can always catch a worker instantly if he shirks, then any positive cost of job loss is enough to prevent shirking. If monitoring is imperfect, the minimum required cost of job loss may be high. I will assume that monitoring is costly.

One of the most interesting implications of the work/shirk model is that unemployment may be not only possible but inevitable. The outcome predicted by standard Walrasian models -- no unemployment and workers are offered the same wage by every firm -- is not a possible outcome if monitoring is imperfect. If it occurred workers could find a new job at the same wage as soon as they were fired so the cost of job loss would be zero and they would shirk. If the work/shirk model is correct unemployment is necessary for the wage system to work.

The model also yields interesting predictions about relative wages. Workers will receive high wages if it is difficult to monitor them, if a pause in their work is costly to the firm and if carelessness is costly to the firm. The second and third consideration suggest that workers who work with expensive capital will be paid a higher wage than similarly able workers who do not. In other words the model suggests that workers in manufacturing will be paid higher wages than workers in say retail and wholesale trade. This is true of every country for which the answer is known. In general wages in an industry are higher the higher is the capital labour ratio. There are however many other possible explanations of this pattern.

In an attempt a greater clarity I will discuss a work/shirk model originally described by Shapiro and Stiglitz. Time is continuous Firms and workers live forever and nothing changes except some workers get jobs and some workers lose them. Workers work or shirk. Workers prefer to shirk and they are indifferent between shirking and getting income w or working and getting income w + m. Workers are risk neutral. Each Firm's output is the same concave function of the number of its employees who are actually working. so it is f(L) if they pay enough to keep their workers working 0 if not. Clearly all firms will pay a wage just high enough to make workers work. The price of output is normalized to 1. there is an interest rate of r which is the same for firms and workers. if a worker shirks for dt there is a probability edt that he will be caught. Even if the worker does not shirk he loses the job with probability
adt < edt because e.g. the firm thought he shirked (or for any of a number of other possible reasons which are not formally modeled). The number of workers and firms is normalized to

one.   u is the unemployment rate.   The unemployed receive income (and leisure) equivalent in value to working for a wage b. To summarize the preferences of workers their happiness at a given time t h_t is w if they work,
w + m if they are employed and shirk and b if they are unemployed. At time t they maximize the expected value of 5

5) $$\int_{s=t}^{\infty} e^{r(t-s)} h_t \, dt$$

since it is assumed that technology and preferences do not change, the wage and the unemployment rate do not change so 5 has only two possible values VJ if the worker has a job and VU if the worker does not have a job.

In equilibrium no-one shirks so the number of job separations equals a*(1-u). All unemployed have the same chance of getting a job which means that the chance of getting a job is a(1-u)/u. VU can be considered the price of an asset, the right to b and a chance at a job. The interest rate times price of an asset to a risk neutral agent is the income it generates (b) plus the expected change in its value (VJ-VU)a(1-u)/u so VU is described by equation 6

6) VU = (b + (VJ-VU)a(1-u)/u)/r

this already shows that if there is no unemployment (u=0) then VJ must equal VU (or else VU would have to be infinite which is impossible). This means that their would be no incentive to work and no-one would work so each firm would benefit by increasing its wage.   This means that the unemployment rate has to be positive in equilibrium.

equation 6 "simplifies" to an equation for the cost of job loss VJ-VU

7) VJ−VU = (rVJ − b)/(r + a(1−u)/u)

In theory VJ is more difficult to calculate than VU since it might be greater for a worker who works than one who shirks. In practice firms will pay a wage which means they are equal so

8) VJ = (w − a(VJ−VU))/r = (w + m − e(VJ − VU))/r

solving out for VJ and (VJ − VU) this implies that

9) w = b + (mr + (ma/u))/(e−a)

Equation 9 is much simpler than the 6, 7 and 8 but it is still a little messy. It does make various things clear however. w is clearly greater than b. This means that the wage is higher than market clearing since by assumption the unemployed would be willing to work for b. Again it is clear that the unemployment rate can't be zero since then the wage would have to be infinite to make anyone work. Also if e is equal to a, the wage would have to be infinite since workers would have as great a chance of being fired if they worked as if they didn't. Higher m means higher wages since workers are more eager to shirk so they have to value their jobs more. Finally increased r increases the w required to clear the labour market since workers care less about future punishment.

The work/shirk model has been criticized because there are other cheaper ways to make job loss costly than to pay high wages. If wages are higher than market clearing firms could

demand that workers pay them to be hired which payment would not be refunded if they were fired. Equivalently, firms could pay the market clearing wage and require workers to post a bond which would be forfeited if the worker was caught shirking. As described these schemes are impractical since unemployed workers can't afford to buy jobs or post bonds but a similar result is obtained if the firm pays workers less than the market clearing wage in the first years after they are hired and more than the market clearing wage later. In effect it subtracts the bond from wages in early years and repays it (to workers who have not been fired in later years).

This idea is very interesting for its own sake as well as a critique of efficiency wage models since it can explain why wages increase with tenure at the firm an phenomenon which is otherwise rather puzzling. The increase in wages with tenure is often thought to be due to the fact that more experienced workers are more productive. However managers report that wages rise more quickly than productivity (as is predicted by work/shirk theories). It has problems of its own however. One is that if the firm pays older workers more than younger workers it might be tempted to get rid of them by claiming they have shirked. This problem can be avoided if the firm agrees to give away the forfeited bonds of fired workers.

Another problem is that if the wage is market clearing workers are indifferent about whether to take the job when it is offered. Eventually as their bond builds up they will begin to fear losing the job, but when freshly hired they will not and might shirk. Akerlof and Katz have described a model in which it is more profitable to pay a higher than market

clearing wage than to have wages rise with tenure and accept unmotivated newly hired workers. It is essential for their results that workers have finite lives, this is (sad to say) true, but not assumed by Shapiro and Stiglitz.

Finally if workers are not free to borrow they act as if they face a higher interest rate than the firms. That means that a stream of wages which is equally valuable to the worker is more costly (in present value) to the firm. This means that it can be less costly to the firm to raise the present value of wages to workers a little above the market clearing wage than rely on paying higher wages later. In general firms offer a stream of wages higher than that which clears the labour market and which rises with tenure more quickly than productivity.

Another theory of efficiency wages -- the turnover model -- also depends on the cost of job loss. According to this model quits are costly to the firm since it has to train replacement workers. The firm might then find it profitable to increase wages in order to reduce quit rates. At the market clearing wage, the firm would be able to attract just enough new workers to replace those who had quit. At a higher wage fewer current workers would quit (and more people would ask for the job). The firm would reduce training costs. The implications of this model are slightly different from the implications of the work/shirk model. The optimal cost of job loss and therefore wage would depend on the cost of training new workers not the cost of shirking. More importantly the cost of quitting is not the same as the cost of being fired. In particular workers usually quit only when they have found a

new and better job. This probably means that the cost of quitting depends more on relative wages and less on the unemployment rate than the cost of being fired. It is perhaps slightly easier to explain why wages do not fall when unemployment increases with the turnover model than with the work/shirk model. It is however certainly true that the quit rate falls when the unemployment rate rises and the turnover model does not explain why firms have not lowered wages as a result.

Since turnover depends on the cost of job loss like shirking, it too can be prevented by paying young workers less and old workers more.

A fourth theory of efficiency wages is the adverse selection model. It assumes that the reservation wages of less desirable workers are lower than the reservation wages of more desirable workers. If so firms which offer low wages will be able to hire only undesirable workers. If the form offers higher wages both undesirable and desirable workers will ask for the job. Even if all the firm can do is hire applicants at random and turn the rest away, it may be profitable to do so. It is possible to understand why undesirable workers would have lower reservation wages if each firm uses a different imperfect method to evaluate workers and if workers know their true ability. If the firm offers job applicants the lowest wage it thinks they will accept given its impression of their desirability only applicants whose desirability it has overestimated will accept the job.

Like the work/shirk and turnover models, the adverse selection model is invalid if firms can demand bonds. Firms

can demand that workers tell the firm the worker's ability and post a bond which will be forfeit if the worker turns out to be less able than he said.

Finally it is possible that firms pay higher than market clearing wages because paying workers as little as they can makes workers angry at them. To be slightly more precise, workers may believe that the market clearing wage is unfairly low and be retaliate if they are paid that little. Psychologists and sociologists (and everyone else) have collected extensive evidence that people respond in this way. Needless to say most economists are unenthusiastic about this sort of theory but it explains a large number of otherwise mystifying facts. One is that firms in high wage industries pay all their workers high wages. The work shirk model, human capital models and compensating differentials models can explain why e.g. steel workers are paid high wages, but can't explain why secretaries who work for steel companies are paid high wages. If secretaries perception of what is fair is based partly on what other workers in the same firms are paid then the fact can be explained.

Similarly it is hard to understand why wages in highly profitable industries are high, but again it is clear why this would make perceived fair wages high.

Finally the morale model unlike the other models does not depend on the cost of job loss. Therefore requiring bonds is not a profitable solution for the firm. That would only make workers angrier. Also it is not clear how much perceptions of fairness are affected by unemployment, so it is not clear how

much wages would fall when unemployment rises and whether this would be enough to clear the labour market.

Insider outsider models

I find it almost impossible to distinguish insider outsider models from the morale efficiency wage model. They are different but make the same predictions about observable and slightly different predictions about how people feel about what they are doing.

The simplest insider outsider models describe the power of unions to force firms to pay higher wages. In theory this causes wage inequality unless centralized contracts bargained by unions are imposed on all firms (as they are in most countries on this continent). In practice even in the USA say where this is not done, unions almost certainly reduce wage inequality even though union members have wages considerably higher than otherwise similar non-members (at least 20% and perhaps more). This is true, since unions are more likely to represent blue collar (production) workers than managers and supervisors and since they depress the increase in wages with seniority (tenure) and since they eliminate individual specific differentials (people doing about the same job for the same firm for different wages believe me this occurs in the USA).

Even if workers do not organism unions, firms may choose to pay higher wages if workers could get higher wages by joining unions. This is called the union threat effect. Finally even if workers can't unionize (unions are or were banned in many countries) they can informally work slowly,

sabotage production, or harass or refuse to teach new workers if they don't get high wages. This behavior is just like that predicted by the morale model. The difference is that in the insider outsider model workers calculate that they can get higher wages this way while in the morale model they do these things because they are angry and want to do them.

In any version insider outsider models can explain why workers get higher wages if value added per worker is higher, since delays are more costly and if capital/worker is high since they can tie it up if they refuse to work or work slowly.