Overview "Unions and unemployment benefits"

- Introduction
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- A simple labour market
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Introduction

- one capitalist (player 1) who may employ
- 1 or 2 workers (players 2 and 3)

Two partitions:

- AD-partition:

$$\mathcal{P}_{AD} = \{\{1,2,3\}\} \text{ or } \mathcal{P}_{AD} = \{\{1,2\},\{3\}\}$$

- Union partition:

$$\mathcal{P}_u = \{\{1\},\{2\},\{3\}\} \text{ or } \mathcal{P}_u = \{\{1\},\{2,3\}\}$$

Lemma (A rank-order definition of the AD-value)

The AD-value is given by

$$AD_i\left(v,\mathcal{P}\right)=\frac{1}{n!}\sum_{\rho\in RO} MC_i^{K_i(\rho)\cap\mathcal{P}(i)}\left(v\right), i\in N$$

According to this alternative characterization of the AD-value, we consider all rank orders but disregard all players outside player i's component.

Definition (generalized Wiese value)

The generalized Wiese value is the solution function W given by

$$\begin{aligned} & W_i\left(v,\mathcal{P}_{AD},\lambda\right) \\ = \;& \frac{1}{n!}\sum_{\rho\in RO}\begin{cases} v\left(\mathcal{P}_{AD}\left(i\right)\right)-\sum_{j\in\mathcal{P}_{AD}(i)\backslash\{i\}} MC_j, & \mathcal{P}_{AD}\left(i\right)\subseteq K_i\left(\rho\right), \\ MC_i, & \text{otherwise,}\end{cases}\end{aligned}$$

$\lambda\in\left[0,1\right]$ and

$$MC_i := MC_i\left(\rho,\mathcal{P}_{AD},\lambda\right)=\lambda MC_i^{K_i(\rho)}\left(v\right)+\left(1-\lambda\right)MC_i^{K_i(\rho)\cap P_{AD}(i)}\left(v\right).$$

$\lambda=1$ —> Wiese value

$\lambda=0$ —> AD-value (component efficiency!)

$\lambda>0$ —> outside options important

The union outside-option value

Definition (union outside-option value)

The union outside-option value is the solution function OW given by

$$
\begin{aligned}
& OW_i\left(v, \mathcal{P}_{AD}, \lambda, \mathcal{P}_u\right) \\
= \ & \frac{1}{\left|RO_{\mathcal{P}_u}\right|} \sum_{\rho \in RO_{\mathcal{P}_u}} \begin{cases} v\left(\mathcal{P}_{AD}(i)\right) - \sum_{j \in \mathcal{P}(i) \backslash i} MC_j, & \mathcal{P}_{AD}(i) \subseteq K_i(\rho), \\ MC_i, & \text{otherwise,} \end{cases}
\end{aligned}
$$

$\lambda \in [0, 1]$ and

$$
MC_i := MC_i\left(\rho, \mathcal{P}_{AD}, \lambda\right) = \lambda MC_i^{K_i(\rho)}(v) + (1-\lambda)\, MC_i^{K_i(\rho) \cap P_{AD}(i)}(v).
$$

A simple labour market

partitions and payoffs I

zero normal profits for the capitalist: $v(\{1\}) := 0$
specification: $v(N) := 100$, $a_2 := v(\{1,2\})$, $a_3 := v(\{1,3\})$ with $a_2 > a_3 \geq 0$.
unemployment benefits: $v(\{2\}) = v(\{3\}) = u$ and $v(\{2,3\}) = 2u$

$\mathcal{P}_{AD}$	$\mathcal{P}_u$	$OW(v, \mathcal{P}_{AD}, \lambda, \mathcal{P}_u)$
$\{\{1,2,3\}\}$	$\{\{1\},\{2\},\{3\}\}$	$\begin{pmatrix} A := \frac{100}{3} + \frac{a_2}{6} + \frac{a_3}{6} - u \\ B := \frac{100}{3} + \frac{a_2}{6} - \frac{a_3}{3} + \frac{u}{2} \\ C := \frac{100}{3} - \frac{a_2}{3} + \frac{a_3}{6} + \frac{u}{2} \end{pmatrix}$
$\{\{1,2,3\}\}$	$\{\{1\},\{2,3\}\}$	$\begin{pmatrix} D := 50 - u \\ E := 25 + \frac{a_2}{4} - \frac{a_3}{4} + \frac{u}{2} \\ F := 25 - \frac{a_2}{4} + \frac{a_3}{4} + \frac{u}{2} \end{pmatrix}$

A simple labour market

partitions and payoffs II

$\mathcal{P}_{AD}$	$\mathcal{P}_u$	$OW\left(v, \mathcal{P}_{AD}, \lambda, \mathcal{P}_u\right)$
$\{\{1,2\},\{3\}\}$	$\{\{1\},\{2\},\{3\}\}$	$\left(\begin{array}{l} G := \frac{a_2}{2} + \frac{1}{6}\lambda\left(a_3 - u\right) - \frac{u}{2} \\ H := \frac{a_2}{2} - \frac{1}{6}\lambda a_3 + \frac{1}{6}u\left(3+\lambda\right) \\ = \frac{a_2}{2} - \frac{1}{6}\lambda\left(a_3 - u\right) + \frac{u}{2} \\ I := u \end{array}\right)$
$\{\{1,2\},\{3\}\}$	$\{\{1\},\{2,3\}\}$	$\left(\begin{array}{l} J := \frac{a_2}{2} - \frac{u}{2} \\ K := \frac{a_2}{2} + \frac{u}{2} \\ L := u \end{array}\right)$
$\{\{1\},\{2\},\{3\}\}$	$\{\{1\},\{2\},\{3\}\}$ or $\{\{1\},\{2,3\}\}$	$\left(\begin{array}{l} M := 0 \\ N := u \\ P := u \end{array}\right)$

A simple labour market

partitions and payoffs III

- The capitalist prefers to have worker 2 rather than worker 3 as his only employee (profits G and J).
- Unemployment benefits increase wages.
- If worker 2 is the only employee and if the workers are not unionized, worker 2's payoff

$$H = \frac{a_2}{2} - \frac{1}{6}\lambda\left(a_3 - u\right) + \frac{1}{2}u$$

  reveals that the capitalist can use worker 3 to lower worker 2's wage. This mechanism will work,

  - if there is a high degree of flexibility and outside options (λ is high),
  - if worker 3 is productive (if he were employed), and
  - if unemployment benefits are moderate.

  Karl Marx' industrial reserve ....

A simple labour market

partitions and payoffs IV

- Union: capitalist employs worker 3, too, if $100 - a_2 > u$.
- No union: By

$$A > G \Leftrightarrow 100 - a_2 > \frac{1}{2}\left[u\left(3-\lambda\right) - a_3\left(1-\lambda\right)\right]$$

  capitalist might employ worker 3 even if $100 - a_2 < 0$ holds (right hand side may be negative)

  - productiveness
  - versus bargaining effect

- The two workers prefer a union if
  - average productivity in a one-worker firm is sufficiently high, or differently put,
  - average marginal contribution is sufficiently low $\left(\frac{1}{2}\left(100-a_3\right) + \frac{1}{2}\left(100-a_2\right) < 50\right)$ —> overstaffing

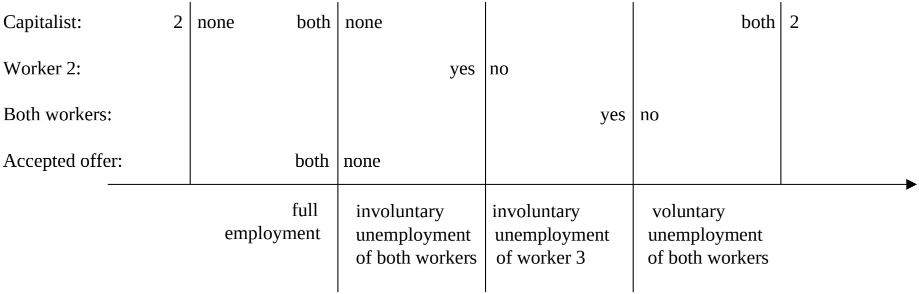
A simple labour market

game sequence

1. The workers decide on unionization.
2. The capitalist makes an employment offer to worker 2, worker 3, both, or none. (Wages are determined later.)
3. The workers accept employment or decline:
   - If any worker declines, no workers are employed.
   - Since the capitalist can foresee the workers' payoffs and decisions, he will make acceptable offers.
4. Wages and profits are determined. We assume $\lambda := 1$.

Definition: An unemployed worker is voluntarily unemployed if employing him - on top of the actually employed workers - would lead to an unattractive wage rate, i.e., a wage rate lower than his unemployment benefit.

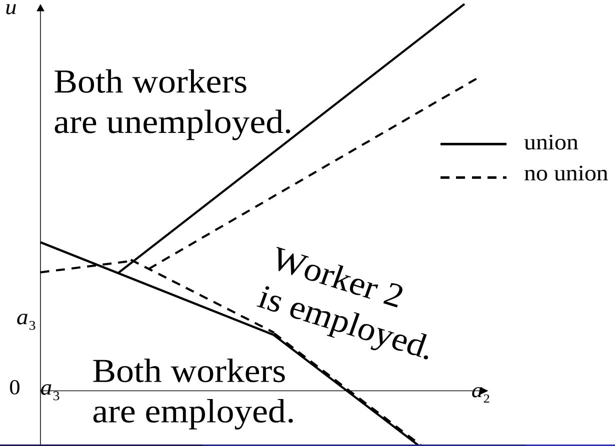
Figure: no union, $a_3 < 50$, $25 + \frac{a_3}{2} < a_2 < \frac{400}{13} + \frac{5a_3}{13}$



A simple labour market

employment and unionization (a3=20)

Uemployment is an increasing function of the level of unemployment benefits. But the effect of unions is unclear; consider the leftmost triangle bordering the u-axis and the very small triangle to the right of this triangle:

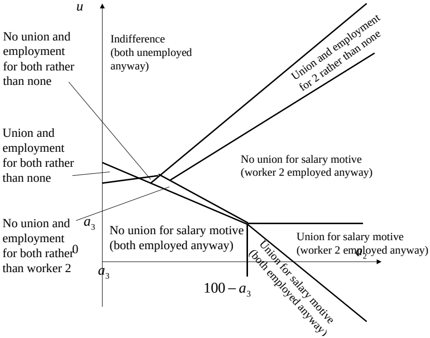


A simple labour market

union choice (stage 1) - a3=20

Two distinct reasons for unionization:

- obtaining a salary instead of unemployment benefits and/or
- increasing salary



If both workers are employed, their preferences coincide. Therefore, unions can never be blamed for unemployment from the point of view of stage 1.