

# Mercados Laborales: Tarea 1 (Equipo 4)

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## Preguntas teóricas

**1. Resuelva los ejercicios 11.2 y 11.9 (5a Ed.). Realice estos con ayuda de su laboratorista y entregue las soluciones a máquina, utilizando LaTeX.**

**11.2.-** Efficiency wages and bargaining. (Garino and Martin, 2000.) Summers (1988), p.386) states, “In an efficiency wage environment, firms that are forced to pay their workers premium wages suffer only second-order losses. In almost any plausible bargaining framework, this makes it easier for workers to extract concessions.” This problem asks you to investigate this claim.

Consider a firm with profits given by  $\pi = [\frac{(eL)^\alpha}{\alpha}] - wL$ ,  $0 < \alpha < 1$ , and a union with objective function  $U = (w - x)L$ , where  $x$  is an index of its workers' outside opportunities. Assume that the firm and the union bargain over the wage, and that the firm then chooses  $L$  taking  $w$  as given.

a) Suppose that  $e$  is fixed at 1, so that the efficiency-wage considerations are absent.

- What value of  $L$  does the firm choose, given  $w$ ? what is the resulting level of profits?

$$\max_L \pi = \frac{L^\alpha}{\alpha} - wL$$

CPO:

$$\begin{aligned} \frac{\partial \pi}{\partial L} : \alpha \frac{L^{\alpha-1}}{\alpha} - w &= 0 \\ \Rightarrow L^{\alpha-1} &= w \\ \Rightarrow L^* &= w^{\frac{1}{\alpha-1}} \end{aligned}$$

Sustituyendo  $L^*$  en  $\pi$  obtenemos  $\pi^*$ , donde la empresa maximiza el beneficio dado  $w$

$$\begin{aligned} \pi^* &= \frac{\left(w^{\frac{1}{\alpha-1}}\right)^\alpha}{\alpha} - w \left(w^{\frac{1}{\alpha-1}}\right) = \frac{w^{\frac{\alpha}{\alpha-1}} - \alpha w^{\frac{\alpha}{\alpha-1}}}{\alpha} \\ \Rightarrow \pi^* &= \left(\frac{1-\alpha}{\alpha}\right) w^{\frac{1}{\alpha-1}} \end{aligned}$$

- Suppose that the firm and the union choose  $w$  to maximize  $U^\gamma \pi^{1-\gamma}$ , where  $0 < \gamma < \alpha$  indexes the union's power in the bargaining. What level of  $w$  do they choose?

$$\begin{aligned} \max_w U^\gamma \pi^{1-\gamma} \\ \max_w [(w-x)L^*]^\gamma \left[ \left(\frac{1-\alpha}{\alpha}\right) w^{\frac{1}{\alpha-1}} \right]^{1-\gamma} \end{aligned}$$

Tomando el logaritmo natural tenemos:

$$\max_w \gamma \left[ \ln(w-x) + \frac{1}{\alpha-1} \ln(w) \right] + (1-\gamma) \left[ \ln\left(\frac{1-\alpha}{\alpha}\right) + \left(\frac{\alpha}{\alpha-1}\right) \ln(w) \right]$$

CPO:

$$\begin{aligned}
\frac{\partial U^\gamma \pi^{1-\gamma}}{\partial w} &: \frac{\gamma}{w-x} + \frac{\gamma}{w(\alpha-1)} + \frac{\alpha(1-\gamma)}{w(\alpha-1)} = 0 \\
\Rightarrow \frac{\gamma}{w-x} &= - \left[ \frac{\gamma + \alpha - \alpha\gamma}{w(\alpha-1)} \right] = - \left[ \frac{\alpha + \gamma(1-\alpha)}{w(\alpha-1)} \right] \\
\Rightarrow \gamma &= - \left[ \frac{\alpha + \gamma(1-\alpha)}{w(\alpha-1)} \right] (w-x) = \frac{-\alpha - \gamma(1-\alpha)}{\alpha-1} + \frac{x(\alpha + \gamma(1-\alpha))}{w(\alpha-1)} \\
&\Rightarrow \frac{x(\alpha + \gamma(1-\alpha))}{w(\alpha-1)} = \gamma + \frac{\alpha + \gamma(1-\alpha)}{\alpha-1} = \frac{\alpha}{\alpha-1} \\
&\Rightarrow w^* = \frac{x(\alpha + \gamma(1-\alpha))}{\alpha}
\end{aligned}$$

b) Suppose that  $e$  is given by equation (11.12) in the text:  $e = \left[\frac{w-x}{x}\right]^\beta$  for  $w > x$  where  $0 < \beta < 1$ .

- What value of  $L$  does the firm choose, given  $w$ ? What is the resulting level of profits?

$$\max_L \pi = \frac{\left(\left(\frac{w-x}{x}\right)^\beta L\right)^\alpha}{\alpha} - wL$$

CPO:

$$\begin{aligned}
\frac{\partial \pi}{\partial L} &: \frac{\alpha \left(\left(\frac{w-x}{x}\right)^\beta L\right)^{\alpha-1}}{\alpha} - w = 0 \\
\Rightarrow w &= \left(\frac{w-x}{x}\right)^{\alpha\beta} L^{\alpha-1} \\
\Rightarrow L^{\alpha-1} &= w \left(\frac{x}{w-x}\right)^{\alpha\beta} \\
\Rightarrow L^* &= \left(w \left(\frac{x}{w-x}\right)^{\alpha\beta}\right)^{\frac{1}{\alpha-1}} = \left(\frac{w-x}{x}\right)^{\frac{\alpha\beta}{1-\alpha}} w^{\frac{1}{\alpha-1}}
\end{aligned}$$

Sustituyendo  $L^*$  en  $\pi$  obtenemos  $\pi^*$ , donde la empresa maximiza el beneficio dado  $w$

$$\begin{aligned}
\pi^* &= \frac{\left[\left(\frac{w-x}{x}\right)^\beta \left(\frac{w-x}{x}\right)^{\frac{\alpha\beta}{1-\alpha}} w^{\frac{1}{\alpha-1}}\right]^\alpha}{\alpha} - w \left(\frac{w-x}{x}\right)^{\frac{\alpha\beta}{1-\alpha}} w^{\frac{1}{\alpha-1}} \\
\Rightarrow \pi^* &= \frac{\left[\left(\frac{w-x}{x}\right)^{\frac{\alpha\beta}{1-\alpha}} w^{\frac{\alpha}{\alpha-1}}\right]}{\alpha} - \left(\frac{w-x}{x}\right)^{\frac{\alpha\beta}{1-\alpha}} w^{\frac{\alpha}{\alpha-1}} = \left(\frac{1-\alpha}{\alpha}\right) w^{\frac{\alpha}{\alpha-1}} \left(\frac{w-x}{x}\right)^{\frac{\alpha\beta}{1-\alpha}}
\end{aligned}$$

- Suppose that the firm and the union choose  $w$  to maximize  $U^\gamma \pi^{1-\gamma}$ ,  $0 < \gamma < \alpha$  What level of  $w$  do they choose? (Hint: For the case of  $\beta = 0$ , your answer should simplify to your answer in part [a][ii].)

- Is the proportional impact of workers' bargaining power on wages greater with efficiency wages than without, as Summers implies? Is it greater when efficiency-wage effects,  $\beta$ , are greater?

## Ejercicios prácticos

### 2. Estudie el mercado laboral en México siguiendo estos pasos:

- Obtenga del INEGI una serie anual de los salarios (en términos reales) en México, calcule la serie de su tasa de cambio anual, calcule la volatilidad de dicha serie. (Serie 1)

```
# Cambio Porcentual

empleo <- read_excel("Empleo.xls",
                     sheet = 1)

empleo$Periodos <- year(parse_date_time(empleo$Periodos, orders = "%Y/%q"))

empleo <- empleo %>% group_by(Periodos) %>% summarise(`PEA Ocupada`, PEA_Ocup_anualizado = mean(`PEA O

empleo <- empleo[!duplicated(empleo[c('PEA_Ocup_anualizado')]),]

empleo <- empleo %>% mutate(Serie_2 = (PEA_Ocup_anualizado/lag(PEA_Ocup_anualizado)-1)*100)

empleo <- empleo[,c(1,3,4)]

# Volatilidad
Serie_2 <- empleo$Serie_2

vol_s2 <- sd(Serie_2, na.rm = T)

vol_s2
```

```
## [1] 2.705578
```

- Obtenga del INEGI una serie anual del empleo total en México, calcule la serie de su tasa de cambio anual, calcule la volatilidad de dicha serie. (Serie 2)

```
#Cambio Porcentual

datos <- read_excel("PIB_K.xls",
                    sheet = 1)
```

- Obtenga del INEGI una serie anual del producto interno bruto en términos reales, calcule su tasa de cambio anual, calcule su volatilidad. (Serie 3)
- Grafique las tres series de tasas de cambios de forma que se puedan comparar.
- Calcule la covarianza de la serie 1 con la 3 y de la 2 con la 3.
- Explique si sus resultados son o no consistentes con los hechos estilizados para EEUU que se discutieron en clase.