Economics 614
Problem on real rigidity

Take the imperfect-competition model of section 6.5 but change the assumption about the production function. In the baseline model, $Y_i = L_i$. For this problem, instead assume a Cobb-Douglas production function with the capital stock fixed and equal to one. Thus $Y_i = L_i^{1-\alpha}$ *where* $0 < \alpha < 1$. Note if $\alpha = 0$ this is equivalent to $Y_i = L_i$.

How does this change in assumptions affect "real rigidity"? That is, does it tend to increase, decrease, or have no effect on the coefficient φ in the equation $p_i - p = c + \varphi y$? If the answer to this question depends on parameter values, assume the values Romer would, e.g. the values on p. 277-79.

If it makes φ smaller, it *increases* real rigidity.

To answer the question, do the following.

1) Start with a function that gives a firm's nominal profit (notation different from book here):

$$\pi_i = Y_i P_i - W L_i$$

Using the product demand function $Y_i^D = Y(P_i / P)^{-\eta}$ and the production function, write an expression that gives π_i in terms of P_i, W, P and Y. Using this expression, find the profit-maximizing price P_i^* in terms of W, P and Y.

Did you get this right? If you got it right, your expression for P_i^* should be the same as expression (6.57) in the textbook if you set α=0.

2) Rearrange your expression for P_i^* to get P_i^* in terms of P, Y and the real wage W/P. To check, again see whether it is equivalent to expression (6.57) in the textbook for α=0.

3) Now get an expression for P_i^* in terms of P and Y . To do this, get rid of W/P in the expression you got in 2), by using the labor-market-clearing real wage:

$$\frac{W}{P} = L^{\bar{a}-1}$$

To do this, use the condition that in the economy as a whole $Y_i = Y$ (output per firm equals output per household) and $L_i = L$ (labor input per firm equals labor supplied per household).

4) Taking logs of the expression in 3) gives you the real rigidity equation for this economy.
Well? What's the answer to the question?