

ECONOMICS 7344 – MACROECONOMIC THEORY II, Spring 2009

Homework 3. Wednesday February 11. Due Monday February 16. (It would be helpful for you to do before the class Monday. This homework is a bit short, we will make up for that next week.)

1. Compare the formulas (6.50) and (6.51) in the text. Calculate the profits π_{FIXED} and π_{ADJ} for a 10 percent increase in real demand (M/P) (just start from $M/P = 1$) for $\eta = 3$ and $\nu = 0.1$. Sketch the labor supply curve for this value of ν . Redo the calculations for $\eta = 2$. Interpret why the result change. Then assume that $\nu = 8$ and calculate the profits for this value (keep $\eta = 3$) and interpret. Sketch the labor supply curve for this value and interpret why it is different from the previous one.

2. Define the lag polynomial $a(L) = a_0 + a_1 L$ and $b(L) = b_0 + b_1 L + b_2 L^2$. (Notice: in the notes, and in book, it is often assumed $a_0 = 1$ and $b_0 = 1$. This doesn't matter much since you can always write $a(L)$ as $a_0 a'(L)$ where the lag polynomial $a'(L) = 1 + \frac{a_1}{a_0} L$ and similarly for $b(L)$. The constant a_0 will not affect the properties of the lag-polynomial that we care about. Also notice: The coefficients are real numbers (occasionally complex numbers) and can be negative or positive, it is therefore purely a matter of taste if you write $a(L) = a_0 + a_1 L$ or $a(L) = a_0 - a_1 L$.)

i) Find $a(L)b(L)$. You *have to* do that by finding $a(L)b(L)x_t$ using the definition that $a(L)b(L)x_t = a(L)[b(L)x_t]$ and simplifying.

Define $a(x) = a_0 + a_1 x$ and $b(x) = b_0 + b_1 x + b_2 x^2$.

ii) Find $a(x)b(x)$ and compare to $a(L)b(L)$.

3. Define the polynomials $a(x) = 1 + .3x$ and $b(x) = 1 - .5x - .5x^2$ and find the roots [meaning the solution(s) to, say, $a(x) = 0$] in each polynomial. What are the roots of the polynomial $c(x) = a(x) * b(x)$? (We will talk about roots of lag-polynomials in class Monday and these are the same as the roots of the real polynomials with the same

coefficients. The intention of this little question is for you to recall your knowledge of finding roots in polynomials before the class.)