Problem Set #3: Investment, Depreciation, and METRs

ECON 6430, Prof. Jason DeBacker
Due Thursday, April 10, 2:40 p.m.

For each of the problems below, it may be helpful to use Excel (or some other software) to make the calculations. Also, you may find the Excel files with examples from class helpful. It can be found here.

1. Calculate the NPV of an $100 investment under MACRS depreciation assuming a depreciable lives of 3, 5, 7, 10, 15, and 20 years. (Hint: you might need to assume something to do this). How do these values vary?

2. Calculate the user cost of capital assuming that the required rate of return, $r$ is 5% and economic depreciation is 20%. Further assume that the corporate income tax rate, $u$, is 35%, the dividend tax rate, $t$, is 15%, and the NPV of tax depreciation on a $1 investment, $z$, is $0.9$.

   (a) Now, holding constant all other parameters, plot the user cost of capital as you vary the corporate income tax rate between 0 and 100%.

   (b) Holding constant all other parameters, plot the user cost of capital as you vary the dividend tax rate between 0 and 100%.

   (c) Holding constant all other parameters, plot the user cost of capital as you vary the NPV of depreciation deductions between 0 and $1$.

3. Using the baseline parameter assumptions from the previous problem, calculate the cost of capital, ignoring the dividend tax (here, you’ll be subtracting off $d$ to get a return). Calculate the METR.

   (a) Now, holding constant all other parameters, plot the METR as you vary the corporate income tax rate between 0 and 100%.

   (b) Holding constant all other parameters, plot the user METR as you vary the NPV of depreciation deductions between 0 and $1$.

4. Use words to explain why bonus depreciation rules are an attractive form of stimulus to policymakers?