Assignment 5

## Automatic Stabilizers

1. So far, we have assumed that the fiscal policy variables G and T are independent of the level of income. In the real world, however, this is not the case. Taxes typically depend on the level of income and so tend to be higher when income is higher. In this problem, we examine how this automatic response of taxes can help reduce the impact of changes in autonomous spending on output.

Consider the following behavioral equations:

C = c0 + c1YD

T = t0 + t1Y

YD = Y - T

G and I are both constant. Assume that:

0 < t1 <1

1. Solve for equilibrium output

$$Y=Z$$

$$Y=c\_{0}+ c\_{1}\left(Y-t\_{0}-t\_{1}Y\right)+I+G$$

$$Y=\frac{1}{(1-c\_{1}+c\_{1}t\_{1})}\left[c\_{0}-c\_{1}t\_{0}+I+G\right]$$

1. What is the multiplier? Does the economy respond more when t1 is 0 or when t1 is positive? Explain the economic intuition, not just the mathematical intuition.

*The multiplier is:*

$$\frac{1}{\left(1-c\_{1}+c\_{1}t\_{1}\right)}$$

*When t1 is positive, this reduces the value of the multiplier. The intuition here is that some of the money that has been taxed from households would have been spent had they kept it. That is why we have c1 (the portion of income spent) multiplied by t1 in the denominator.*

## Investment and Income

1. This problem examines the implications of allowing investment to depend on output/income. Our module on investment carries this analysis much further and introduces an essential relation—the effect of the interest rate on investment—not examined in this problem.

Suppose the economy is characterized by the following behavioral equations:

C = c0 + c1YD

YD = Y - T

I = b0 + b1Y

Government spending and taxes are constant. Note that investment now increases with output.

1. Solve for equilibrium output.

$$Y=\frac{1}{(1-c\_{1}-b\_{1})}\left[c\_{0}-c\_{1}T+b\_{0}+G\right]$$

1. What is the value of the multiplier? How does the relation between investment and output affect the value of the multiplier? What condition must ($c\_{1}+b\_{1}$) satisfy? Explain your answers.

*The multiplier is:*

$$\frac{1}{(1-c\_{1}-b\_{1})}$$

*The addition of a marginal propensity to invest will increase the size of the multiplier. In order for the denominator to make sense* $c\_{1}+b\_{1}$ *must be between 0 and 1. Otherwise the multiplier will not be a real number or will be negative (which doesn’t make economic sense).*

1. Suppose that the parameter b0, sometimes called business confidence, increases. How will equilibrium output be affected? Will investment change by more or less than the change in $b\_{0}$? Why? What will happen to private saving (there is no government in this problem)?

*Equilibrium output will fall by*$$b\_{0}\frac{1}{(1-c\_{1}-b\_{1})}$$

*This will be greater than the initial change in* $b\_{0}$ *because the usual logic of the multiplier still applies (and is now expanded. Private saving will increase (because income will rise).*

## Credit Rationing

1. Describe, in your own words, the relevance of credit rationing for our theories of consumption. What causes credit rationing?

*Answers will vary but should emphasize the role of credit in allowing consumption smoothing in forward looking theories of consumption. Without credit access, it will be unlikely that many households could smooth their consumption over income fluctuations effectively. Thus our initial consumption function where consumption is dependent on current (not future) income would be more accurate than the forward looking theories. Credit rationing is caused by imperfect and asymmetric information. Borrowers know more about their financial health and intentions than lenders. This leads to a market for lemons problem and credit restrictions. Other examples of credit rationing include redlining.*