Aggregate Production Function

1. Suppose the labor market is initially in equilibrium and that you are using a classical model. Holding everything else constant, Suppose that

(a) U.S. government decreases the income tax. What will result in our aggregate production level?

Labor supply curve shifts to the right, more labor in the Aggregate Production Function (holding other things the same), aggregate production level increases.

(b) In order to fight back terrorists, the congress has decided to increase the number of soldiers by 5%. What will result in our aggregate production level?

Labor supply curve shifts to the left, less labor in the Aggregate Production Function, aggregate production level decreases.

(c) There is a severe capital outflow from the USA to emerging markets, What will result in our aggregate production level?

The capital stock in US decreases, Aggregate Production Function shifts down

2. The demand and the supply of labor in the country of Myland are:

$$L^S = w - 10$$
$$L^D = 70 - 3w$$

The aggregate production function is:

$$\text{Real GDP (in billions)} = 300 - \frac{1500}{5 + \text{Quantity of Labor}}$$

What is the real GDP, wage rate, and labor productivity corresponding to the full employment (potential output)?

Set $L^s = L^d$, solving the equations we get that w=20 and L=10, so full employment quantity of labor =10 and the wage rate is 20.

Real GDP (in billions) = 300 – 1500/(5+10) = 200

Labor Productivity = 200 /10 = 20

Quantity Theory of Money

3. In 2005 the aggregate price level in Tropicia is 1, and real GDP is $5000 Furthermore, suppose the money supply available in the market is $4000.

(a) What is the velocity of money in Tropicia?

$V=(P*Y)/M=(1*5000)/4000=1.25$

(b) In 2006 suppose the money supply increases by 50% and real GDP has increased by $400. Given that the velocity of money is the same as in 2005, what is the new aggregate price level in Tropicia in 2006? What is the inflation rate from 2005 to 2006?

$P'=(V*M')/Y'=(1.25*4000*(1+50\%))/(5000+400)=1.39$
Inflation Rate=(1.39-1)/1*100%=39%

(c) Suppose the velocity of money in Tropicia changed to 1.5 in 2006 from 2005 and other things are the same as in (b). What is the new aggregate price level in Tropicia in 2006? What is the inflation rate from 2005 to 2006?

$P'=(V'*M')/Y'=(1.5*4000*(1+50\%))/(5000+400)=1.67$
Inflation Rate=(1.67-1)/1*100%=67%
OR an approximation: $\triangle V + \triangle M = \triangle P + \triangle Y$, so $\triangle P = \triangle V + \triangle M - \triangle Y =(1.5-1.25)/1.25+0.5-0.08=0.62$

Income and Saving

4. Tropicia is a closed economy.

(a) Mark, a resident in Tropicia, made $30,000 last year. After paying $6000 tax, he spent $18,000 as consumption. How much did Mark save for the last year?

30000-6000-18000=6000

(b) Suppose in 2006 the total national income in Tropicia was 6 trillion, among which 3.5 trillion was used for consumption, and the government collected 0.5 trillion tax. How much was saved in 2006?

National Income=Y=C+S+T   OR C+S=disposable income
S=Y-C-T=6-3.5-0.5=2

(c) Continued from (b), if government spending was 1 trillion, what was the private investment of Tropicia in 2006?
In closed economy, Real GDP=National Income=Y=C+I+G

I=Y-C-G=6- 3.5 - 1=1.5
OR
I=Sprivate + Spub= Sprivate +(T-G)=2+(0.5-1)=1.5