Problem Set #1

1. Metru Nui is an island city with a labor supply \( L = 50,000 \) and a capital stock \( K = 500 \). Their production function is \( Y = \frac{1}{2} L^2 K^2 \). Their economy is well described by the following equations:

\[
Y = C + I + G + NX
\]
\[
C = 250 + 0.75(Y - T)
\]
\[
I = 1000 - 50r
\]
\[
G = 1000
\]
\[
T = 1000
\]
\[
NX = 0
\]

There is no trade because they are located far below the surface of the island Mata Nui. Let the price level equal 1. What is \( Y \), \( C \) and \( I \)? What is the wage \( w \) and interest rate \( r \) in this economy?

2. Consider an economy that produces and consumes covfefe and hamburgers. In the following table are data for two different years.

<table>
<thead>
<tr>
<th>Goods</th>
<th>2010</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Price</td>
</tr>
<tr>
<td>Covfefe</td>
<td>300</td>
<td>$2</td>
</tr>
<tr>
<td>Hamburgers</td>
<td>300</td>
<td>$3</td>
</tr>
</tbody>
</table>

a. Using 2010 as the base year, compute the following statistics for each year: nominal GDP, real GDP, the implicit price deflator for GDP, and the CPI.
b. By what percentage did prices rise between 2010 and 2018? Give the answer for each good and also for the two measures of the overall price level. Compare the answers given by the Laspeyres and Paasche price indexes. Explain the difference.

3. Use the neoclassical theory of distribution to predict the impact on the real wage and the real rental price of capital of each of the following events.
a. A wave of immigration increases the labor force.
b. An earthquake destroys some of the capital stock.
c. A technological advance improves the production function.
d. High inflation doubles the prices for all factors and outputs in the economy.

4. The government raises taxes by $100 billion. If the marginal propensity to consume is 0.8, what happens to the following? Do they rise or fall? By what amounts?
a. Public savings (T-G)
b. Private savings (Y-C-T)
c. National savings
d. Investment
5. Suppose that an increase in consumer confidence raises consumer’s expectations about their future income and thus increases the amount they want to consume today. This might be interpreted as an upward shift in the consumption function. How does this shift affect investment and the interest rate?

6. Suppose that the government increases taxes and government purchases by $100 billion. What happens to the interest rate and investment in response to the balanced-budget change? Explain how your answer depends on the marginal propensity to consume.

*Due Friday 1 February*