

Economics 100B Fall 2005 Final Exam Review Solutions
Chapter 15
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1. From the Law of One Price, we know that $E \cdot P = P^W$, where E is the exchange rate, P is the United States Price and P^W is the world price.
 Therefore, $P^W = (20,000 \text{ dollars/tuition}) \cdot (10 \text{ Euros/dollar}) = 200,000 \text{ Euros}$

2. If the price of a Big Mac is \$6, we must convert this to Euros. Notice that the units on the exchange rate are in \$/Euro. Therefore, to reverse the units, we reciprocate the exchange rate.

$$\frac{1}{E} = \frac{1}{2\$/Euro} = \frac{1Euro}{2\$}$$

Using $E \cdot P = P^W$, we obtain: $P^W = (6 \text{ dollars/Big Mac}) \cdot (.5 \text{ Euros/dollar}) = 3 \text{ Euros}$

If the price of a Big Mac in Germany is 5 Euros, we can now use $E \cdot P = P^W$ without having to adjust any of the units. Now, we define P as the price in Europe and P^W as the United States price because the units of the exchange rate are 2 dollars/Euro. Therefore, we obtain the following:

$$P^W = (2 \text{ Euros/Big Mac}) \cdot (2 \text{ dollars/Euro}) = 4 \text{ dollars}$$

It appears the Law of One Price fails to hold. Big Macs are more expensive in the United States. This could be a result of the fact that the dollar is overvalued or the Euro is undervalued – or in other words, one dollar may purchase more Euros than it should be able to purchase. Additionally, the price of inputs to make the good may vary across countries, which will be reflected in the price.

3. We know that the real exchange rate = $(EP)/P^W$. Notice once again that the nominal exchange rate is expressed in units of \$/Euro. This means that if we do not convert the units of the exchange rate, we must define P as the price in Europe. Therefore, the

$$RER = \frac{(5 \$/Euro) \cdot (100Euros)}{200Dollars}. \text{ In other words, the RER} = 2.5.$$

4. We know that the Quantity Theory of Money determines the exchange rate in the long run. We also know that $E = (P^W/P)$. Thus, in order to maintain a fixed level of E, both components of the right hand side of the equation must be moving together. Additionally, the world price level must move exactly with the United States price level. If these two values do not move together, E will deviate from its fixed level. The Quantity Theory of Money tells us that exact price changes must be the result of the money supplies changing by exactly the same amount in both countries.

The consequence of a fixed exchange rate is that a country must give up all of its monetary policy authority to the United States. This can be a good thing if the country has a problem of maintaining a low and stable rate of inflation. However, limiting the monetary policy of a country will make the country with the fixed exchange rate less able to respond to changes in

output. In other words, the country will no longer be able to use monetary policy to help insulate the economy from output shocks.

5. In order to derive the IS Curve, we go through the following steps.

$$Y_t = C_t + I_t + G_t + NX_t$$

We now divide by potential output.

$$\frac{Y_t}{\bar{Y}_t} = \frac{C_t}{\bar{Y}_t} + \frac{I_t}{\bar{Y}_t} + \frac{G_t}{\bar{Y}_t} + \frac{NX_t}{\bar{Y}_t}$$

Substituting in the original equations from the problem, we obtain the following:

$$\frac{Y_t}{\bar{Y}_t} = \bar{a}_c + \bar{a}_i - \bar{b}_i(R_t - \bar{r}) + \bar{a}_g - \bar{d}Gap_t + \bar{a}_{nx} - \bar{b}_{nx}(R_t - \bar{r}) - \bar{n}Gap_t$$

Recall that the output gap is $\frac{Y_t - \bar{Y}_t}{\bar{Y}_t}$.

Therefore:

$$Gap_t = \bar{a}_c + \bar{a}_i - \bar{b}_i(R_t - \bar{r}) + \bar{a}_g - \bar{d}Gap_t + \bar{a}_{nx} - \bar{b}_{nx}(R_t - \bar{r}) - \bar{n}Gap_t - 1$$

Solving for the output gap, we obtain:

$$(1 + \bar{n} + \bar{d})Gap_t = \bar{a}_c + \bar{a}_i + \bar{a}_g + \bar{a}_{nx} - 1 - \bar{b}_i(R_t - \bar{r}) - \bar{b}_{nx}(R_t - \bar{r})$$

If we define $\bar{a}_c + \bar{a}_i + \bar{a}_g + \bar{a}_{nx} - 1 = \bar{a}$ and $\bar{b}_i + \bar{b}_{nx} = \bar{b}$, we obtain the following result:

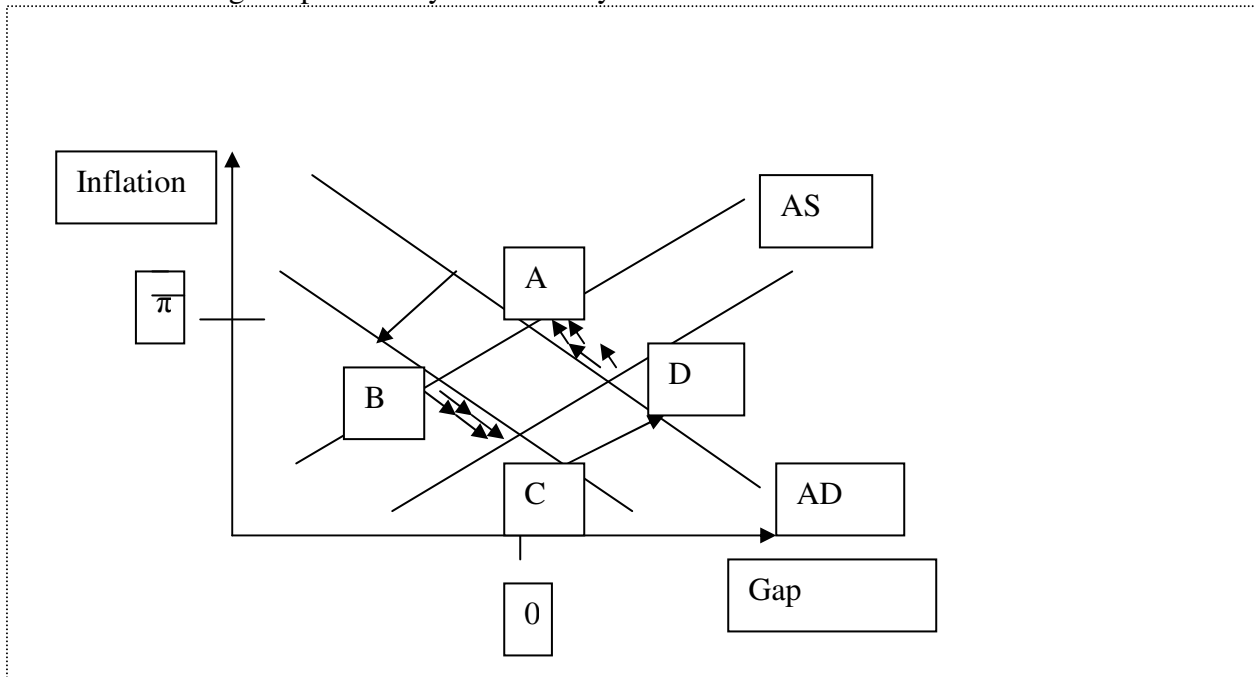
$$Gap_t = \frac{\bar{a} - \bar{b}(R_t - \bar{r})}{(1 + \bar{n} + \bar{d})}$$

The economic interpretation of this equation is two-fold. First, the equation now depends upon net exports, meaning that \bar{r} can be interpreted as the marginal product of capital in addition to the world interest rate. Thus, changes in the interest rate will influence the output gap by influencing investment and net exports. Furthermore, changes in the real interest rate will have less influence on the output gap than in the equations from the text. This is because the responsiveness of demand for imports and automatic stabilizers will buffer the economy from changes in the interest rate.

6. If a foreign country lowers its interest rates, international investors will demand more of the United States dollar. This causes the dollar to appreciate relative to the foreign currency. Thus, the real exchange rate will appreciate in the United States. As this happens, the price of U.S. goods will increase relative to foreign goods. The increase in prices will cause less foreign demand for United States goods. Therefore, exports will decline and imports will increase. The overall movement of net exports is now downward and the change in interest rates has induced a negative output gap.

From the diagram below, we can see that a shock to the world interest rate will shift the AD curve to the left causing a negative output gap. The economy will move from the steady state at point A (a zero output gap and the target rate of inflation) to the new point B. At point B, firms will realize a negative output gap and will want to stimulate demand by lowering prices. This is evident by the shifting of the AS curve, which moves by transition dynamics to point C. Once the AS curve has had a chance to move all the way to a zero output gap, we

assume that the AD shock gets turned off. This causes the AD curve to shift back to its original position, but now the economy is in a positive output gap. Realizing the gap, firms will want to raise prices to reduce demand. Firms raise prices until the AS curve fully shifts back to its original position by transition dynamics.



7. Recall the equation for the IS curve is $Gap_t = \bar{a} - \bar{b}(R_t - \bar{r})$, where we define $\bar{a}_c + \bar{a}_i + \bar{a}_g + \bar{a}_{nx} - 1 = \bar{a}$ and $\bar{b}_i + \bar{b}_{nx} = \bar{b}$. Also recall that the IS curve is plotted with the interest rate on the vertical axis and the output gap on the horizontal axis.

Therefore, we re-express the IS curve by solving for R_t :

$$\frac{Gap_t - \bar{a}}{-\bar{b}} = (R_t - \bar{r})$$

Therefore:

$$(R_t - \bar{r}) = \frac{\bar{a} - Gap}{\bar{b}}$$

As you can see, the slope of the IS curve is $\frac{-1}{\bar{b}}$. Thus a positive shock to \bar{b}_{nx} will bring the slope of the IS curve closer to zero. Therefore, the slope of the IS curve will become less steeply sloped.

Economically, a change in the interest rate now has a larger impact on the output gap. This is because net exports are now more sensitive to the interest rate. We can think of \bar{b}_{nx} as being the derivative of net exports with respect to the interest rate. The same logic can also be applied to the AS/AD model.

8. This question requires us to reflect on the advantages and disadvantages of moving off the gold standard to a new silver dominated standard. Remember, under the gold standard, so long as the supply of gold remains steady, then the supply of money will stay relatively stable. Thus, the gold standard can be responsible for preventing the printing of too much money. For example, if the money supply expands too quickly, then people will exchange their money for gold. This is because there is more money, but the amount of gold is relatively fixed. Additionally, the use of the gold standard worldwide implies a system of fixed exchange rates. If all countries are on a gold standard, all currencies derive their value from gold.

Now, considering the proposal of William Jennings Bryan, you should have some economic objections to the proposal. A sound and stable money supply is the important reasons that was historically given by Republicans in opposition of free silver. Considering the proposal given current economic theory, we reach the following. As economists, we realize that moving to a bimetallic standard with a low price of silver would flood the market with silver. If such were the case, this would alter the exchange rates between countries and would cause higher inflation in the United States. Now the dollar is no longer fixed to the same quantity of precious metals as before; the supply of precious metals has dramatically increased due to the large influx of silver and the government can print a much larger amount of money. From the quantity theory of money, we know this will induce a large amount of inflation. Furthermore, it is known that sudden high inflation has large economic costs to society. High inflation will also create higher prices that will in turn change the demand for exports and imports. Foreign investors may also become more uncertain with regard to capital financing and foreign investment out of fear that they could reduce the value of their investment given a silver standard. However, it is evidently clear that free silver will cause high levels of inflation, which are costly to society as a whole.

Arguing for Bryan's policy also has some current economic logic. William Jennings Bryan argued that reducing the gold standard in exchange for silver would benefit debtors. In that time, inflation was not viewed as the great evil that it is viewed as today. Bryan argued that inducing high inflation would benefit debtors (small farmers) at the expense of creditors (larger bankers). Economic theory does tell us that inflation will distort the payments between debtors and creditors. Furthermore, the U.S. was also in a deflationary period and deflation, like inflation, has costs. However, current economic theory provides a more subtle reason. If the United States is on a bimetallic standard with heavy silver reliance and Britain remains on the gold standard, stable money may be less likely and the exchange rate will be slightly more volatile (slightly closer to floating). Having a more flexible currency could be a good policy, which has not proved disadvantageous under the existing exchange rate regime. However, creating a more flexible currency would have also reversed the deflationary policies of the time.

Ultimately, the economic theory appears to be ambiguous. Historically, the economy was trying to grow, so the real value of money was increasing – causing deflation. So the question is – did the U.S. need a larger money supply at the time? The answer is not necessarily clear and even if the United States did need a larger money supply, the best economic solution may not have been free silver.