

## ECON 300 Spring 2007 Midterm

**Essay** In 2000, the U.S. government ran a budget surplus equivalent to 2.4% of GDP. From 2001 through today, the government has run budget deficits peaking at 3.6% of GDP in 2004. This swing from a surplus to deficit is very similar (as a share of GDP) to the increase in deficit spending that occurred during Reagan's first term in office. Yet by 2005, real interest rates were lower than any time in the previous six years, and the trade deficit was larger (as a share of GDP) than any time since the mid 80s.

- (30 points) Using any models, graphs and equations you need, explain how it might be possible for the U.S. to experience a growing fiscal deficit and simultaneously face falling real interest rates. (Hint, as one possible explanation, consider the last homework problem from Ch. 5—covered in class on Wednesday.)

The swing from surplus to deficit described above implies that national savings for the U.S. has declined. National savings is defined as the sum of private ( $S_p = Y - T - C$ ) and government savings ( $S_g = T - G$ ), or  $S = Y - C[Y - T] - G$ . The reduction in taxes and the increase in government spending have resulted in a large decrease in U.S. national savings.

Because the U.S. is an open economy, it faces the world real interest rate when borrowing and lending; because it is a large economy, large changes in U.S. borrowing or lending will also affect the world real interest rate. We can think of world savings as the sum of US and ROW (rest of world) savings,  $S_w = S_{us} + S_{row}$ . Assuming that the U.S. and ROW investment demand remains unchanged, the world investment demand curve ( $I_{w1}$ ) will not shift. So you would expect that a large decrease in US savings would lead to a decline in world savings, excess demand for loans, and an increase in the world real interest rate. However, if the ROW is increasing its savings by more than the drop in US savings ( $\Delta S_{row} > -\Delta S_{us}$ ), then an increase in world savings from  $S_{w1}$  to  $S_{w2}$  in figure 1 creates an excess supply of loanable funds ( $B - A$ ) and causes the world real interest rate to decline. This was exactly the point made by Ben Bernanke when he referred to a global savings glut.

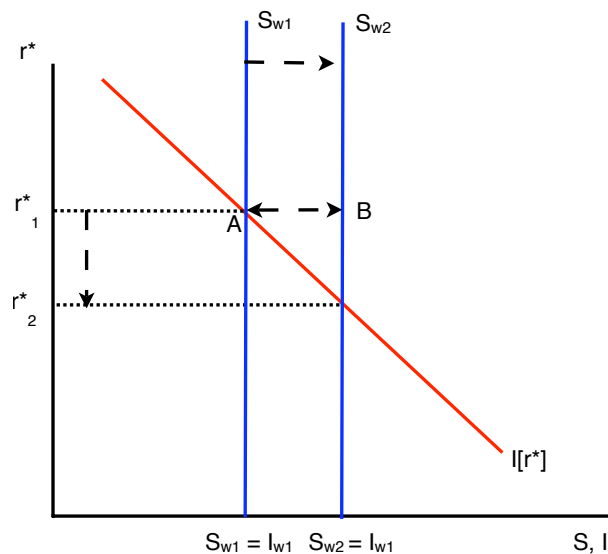


Figure 1: World Savings and Investment

The drop in US savings and the lower world real interest rate are shown below in the US Savings and Investment Graph. Because of the decline in real borrowing costs, there is an increase in the demand for loans (investment demand) in the US. Yet the decline in US savings implies that the US is borrowing heavily from the rest of the world. In other words,  $NFI = NX < 0$ ; the US is running a trade deficit and experiencing capital inflows.

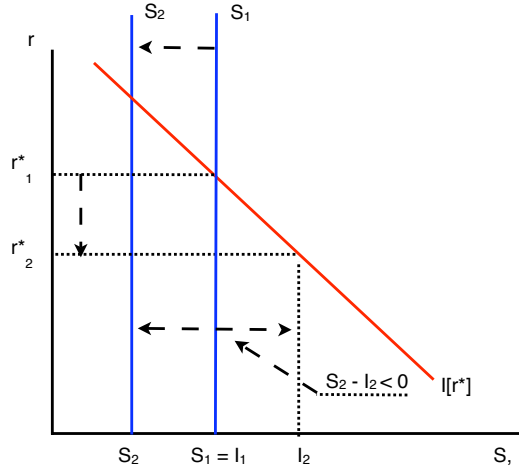


Figure 2: US Savings and Investment

2. (30 points) Now, taking into account that the US is a large open economy, use whatever models, graphs, equations you need to explain how the low real interest rate and US fiscal deficit would affect

- the levels of real investment, consumption, net exports and the real exchange rate for the U.S.
- the nominal exchange rate and inflation rate in the US. (Assume that US and foreign central banks did not change their monetary policy between 2000 and 2005.)

To determine the full effect on net exports and the real exchange rate of a decline in US savings and the increase in US investment, consider the supply and demand for currency (NFI-NX) graph.

We know from the analysis above that US NFI declines. So the  $S - I$  curve shifts leftward to  $S_2 - I_2$ . The result is an excess demand for the dollar, and upward pressure on the real exchange rate. The real exchange rate appreciates until US goods are sufficiently expensive abroad that US exports fall (and imports rise) enough to equate the trade balance and the net capital outflow at  $\epsilon_2$  where  $NX[\epsilon_2] = S_2 - I[r^*_2]$ .

In summary, US real output is unchanged because of our assumption of fixed factor inputs, i.e.  $\bar{Y} = F[\bar{K}, \bar{L}]$ . With a decline in US taxes ( $T_2 < T_1$ ), real disposable income has increased, so real consumption  $C = C[\bar{Y} - T_2]$  has increased. Because the world real interest rate fell with the “glut of world savings”, US real investment has also increased  $I[r^*_2] > I[r^*_1]$ . As the US currency appreciates, US real net exports decline balancing out the increases in domestic consumption, investment, and government spending.

$$\bar{Y} = C \uparrow + I \uparrow + G \uparrow - NX \downarrow \quad (1)$$

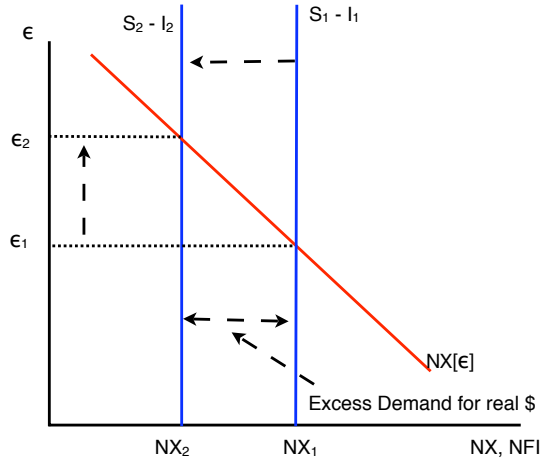


Figure 3: US NFI and NX: Supply and Demand for \$

- (c) the nominal exchange rate in inflation rate in the US. (Assume that the US and foreign central banks are not changing their monetary policy)

Finally, recall that the nominal exchange rate is determined by the real exchange rate and the US and ROW price levels.

$$e = \epsilon \cdot \frac{P^*}{P} \quad (2)$$

We know that the real exchange rate is increasing due to the changes in US and ROW savings and the decline in the real interest rate. With no change in monetary policy, we can think of the supply of money as being constant in the US and ROW. A simple quantity equation version of money supply and money demand,

$$\frac{M}{P} = kY, \quad (3)$$

would lead to the conclusion that  $P$  (and  $P^*$ ) are constant because there has been no change in real output, money, or the velocity of money in the US or abroad. With prices constant, the nominal exchange rate must move one for one with the real exchange rate.<sup>1</sup>

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<sup>1</sup>A full analysis using a money demand function that depends not only on income, but also on the opportunity cost of holding money,  $L[r^* + \pi, Y]$  would lead to the conclusion that prices must be falling. But assuming the impact of a change in the world real interest rate is the same in the US and ROW, i.e. real money demand increases by the same amount and prices fall by the same amount, the nominal exchange rate would still rise with the real exchange rate.