Question 1 (2 points): What accounts for the difference between GDP and GNP? Which one better summarizes the strength of the U.S. economy? Why?

Answer 1
(1 point): The national income accounting defines GNP as GDP plus net receipts of factor income from the rest of the world. Therefore, net receipts of factor incomes accounts for the difference between GDP and GNP. Net factor incomes typically include the followings.
   1. Remittances inflows (or labor income) net of outgoing flows.
   2. Interest earnings and dividend income earned on foreign assets held in the U.S. net of those earned on U.S. assets held abroad.

(1 point): GDP is a better proxy of the strength of the U.S. economy, because it reflects the economic activities taking place in the U.S. only.

Question 2 (2 points): The Bush administration faces a record high budget deficit currently estimated at 4.4% of GDP. Meanwhile, the U.S. current account deficit is 5.6% of GDP. Do you think the administration is responsible for the twin deficits? Explain using current account identities.

Answer 2
(1 point): Current account identity: CA = S – I = Sp – I - (G - T),
   where CA = Current Account,
   S = national Savings
   I = Investment
   Sp = Private Savings
   G = Government purchase
   T = Tax revenue.
As a result, G – T represents the budget deficits. In other words, current account is net private savings net of budget deficits.

(1 point): Substituting the numbers given in the question gives:
   5.6% of GDP = Sp – I - 4.4% of GDP,
   Sp – I = -1.2% of GDP.
This implies that the investment exceeds private savings by 1.2% of GDP, meaning the U.S. private sector borrows about 1.2% of GDP. The twin deficits apply to the situation where both current account and government budget are in deficit, as in this case. Evidently, the size of the budget deficit accounts for approximately 80% of the overall current deficit. So it is reasonable to say that the administration is responsible for the twin deficits.
**Question 3** (2 points):
On January 21, 2005, the Wall Street Journal reported that “Federal Reserve Bank of Richmond President Jeffrey Lacker said that it’s likely the central bank will be able to continue to raise rates in a gradualist fashion this year.” What is the effect of Mr. Lacker’s remark on the exchange rate on January 21, 2005? Explain using a diagram.

**Answer 3**
(1 point): His remark reflects a **future** change in the U.S. interest rate, not the current interest rate. This will affect the expectation about the future exchange rate. Figure 3.A depicts what **would happen** in the foreign exchange market in the future if the U.S. interest rate rises. In Figure 3.A, the R$ curve shifts to the right and causes the dollar to appreciate. Foreign market participants have Figure 3.A in mind, and this will reflect the expectation of exchange rate appreciation. This is described by the downward shift of the downward sloping curve in Figure 3.B. Consequently, current exchange rate falls, i.e. U.S. dollar appreciates right away in Figure 3.B.

(1 point):
*Figure 3.A: Anticipation of future foreign exchange market*

![Diagram of foreign exchange market](image-url)
Figure 3.B: Current foreign exchange market

$E^{e2}_{S/E} < E^{e1}_{S/E}$

$R_E + \left( \frac{E^{1}_{S/E} - E^{e1}_{S/E}}{E^{e1}_{S/E}} \right)$

$R_E + \left( \frac{E^{2}_{S/E} - E^{e2}_{S/E}}{E^{e2}_{S/E}} \right)$

Dollar Return on Euro Assets
Question 4 (2 points): In the lecture, we suppose unrealistically that there is no tax on interest earnings. Then suppose that the U.S. begins introducing a tax on interest earnings from today. How will this tax policy affect the current exchange rate? Explain using a diagram.

Answer 4
(1 point):
Figure 4: Effects of tax on interest earnings on exchange rate

(1 point):
The tax policy will result in a fall in actual interest earnings or return on U.S. dollar assets. This is simply because you must give up a part of interest earnings as tax liabilities. This is equivalent to a shift to the left side of the $R\$ curve in Figure 4. As a result, the current exchange rate will rise, i.e. U.S. dollar depreciates. Note that what determines exchange rate in the foreign exchange market is not the announced interest rate you see in the newspaper, but the actual interest rate net of tax.
**Question 5** (2 points): Using the data in Section 2 Handout, calculate the 3-months and 6-months forward premium on dollar against the British pound. Compare them with the interest rate differentials between the U.K. and the U.S. Does the covered interest parity hold in these cases?

**Answer 5**

(1 point) Forward premium on dollar against the British pound is defined as:

\[(F(\£/\$) - E(\£/\$))/E(\£/\$)\].

Note that the exchange rate is in units of pounds per 1 dollar. This is the opposite for the example in class, as now we are talking about forward premium on dollar, not on pound. In principle, forward premium on currency X is a measure of return you receive through a forward contract by giving up 1 unit of the other currency and investing in currency X. Consider a 3-month forward contract, for example. Forward premium on dollar against pound measures the gain from giving up pound. Suppose you give up 1 pound, you get 1/E dollar today. 3-month from now, you exchange back to pound with the forward rate F(£/$). So the gain through the forward contract is \((F(\£/\$) - E(\£/\$))/E(\£/\$)\), precisely the forward premium on dollar defined above.

(1 point) Calculate the forward premium

Use the “U.K. (pound)” rows. Here is how you read the rows and columns.

- **1st row:** spot rates
- **2nd row:** 1-months forward rates
- **3rd row:** 3-months forward rates
- **4th row:** 6-months forward rates

- **1st column:** rates in $ per £ on Tuesday
- **2nd column:** rates in $ per £ on Monday
- **3rd column:** rates in £ per $ on Tuesday, or the inverse of 1st column
- **4th column:** rates in £ per $ on Monday, or the inverse of the 1st column

Plug in those numbers. Here I use the rates quoted on Tuesday.

3-months forward premium on dollar = \((0.5392 - 0.5365)/0.5365 = 0.0050 = 0.5\%\)

6-months forward premium on dollar = \((0.5414 - 0.5365)/0.5365 = 0.0091 = 0.9\%\)

Calculate the interest rate differentials

Using the definition of the forward premium above, the covered interest parity (CIP) is written as:

\[R\£ = R\$$ + (F(\£/\$) - E(\£/\$))/E(\£/\$)\].

This is equivalent to:

\[R\£ - R\$$ = (F(\£/\$) - E(\£/\$))/E(\£/\$)\].

The left hand side of this formula, \(R\£ - R\$$, is called “interest rate differentials.” Use the interest data that correspond to 3-months and 6-months maturity.

- 3-months interest rate differentials = 2.70\% - 2.66\% = 0.04\%
- 6-months interest rate differentials = 2.92\% - 2.89\% = 0.03\%

The CIP states that the interest differentials must be equal to the forward premium. The gap between the interest rate differentials and the forward premium is 0.46\% for 3-months maturity, and 0.87\% for 6-months maturity. These numbers are well below 1\%, although the gap is larger for the longer maturity. We can say that the CIP holds.