IAS 107: SPRING 2011: UC BERKELEY: PROBLEM SET 6: SAMPLE MIDTERM 1 (Due March 8, 2011):

Identifications (1 sentence):

1. GDP: **GDP—real gross domestic product—is the inflation-adjusted value of all of the marketed goods and services produced, measured in inflation-adjusted dollars per year.**
2. Income-expenditure equation: **The income-expenditure equation tells you what the economy's short-run equilibrium level of GDP is as a function of the four components of autonomous spending—baseline consumption due to consumer confidence, investment, government purchases, and gross exports—and the three behavioral parameters: the government's tax rate, the marginal propensity to consume, and the marginal propensity to import.**
3. Subprime mortgages: **The mortgages that first went bad in the financial crisis: extremely risky loans to low-quality buyers purchasing overpriced houses that investment banks claimed had been turned into safe assets via the alchemy of derivative-based securities.**
4. Unemployment rate: **One of the key measures of how much slack there is the economy: the share of the labor force—those with jobs plus those looking for work—who do not have jobs and are looking for work.**
5. Inflation rate: **The rate at which average prices in the economy are changing.**
6. Long-term real risky interest rate: **How much non-blue chip businesses have to pay in order to obtain capital to expand or continue normal operations, adjusted for inflation.**
7. Investment-savings curve: **With the LTRRIR on the vertical axis and the level of GDP on the horizontal axis, a downward sloping curve that represents the investment-savings equation.**
8. Investment-savings equation: **A version of the income-expenditure model that tells you the level of real GDP as a function of (a) confidence and what is going on abroad, (b) fiscal policy, (c) monetary policy plus the state of financial markets, and (d) the determinants of the multiplier.**
9. Marginal propensity to consume: **The share of an increase (or decrease) in after-tax incomes that shows up as an increase (or decrease) in consumption spending.**
10. About how many people lose or quit their jobs in an average month? **4 million.**
11. About how many people get jobs in an average month? **4 million.**
12. About how many people are unemployed in an average month? **In a normal month? 7 million. Right now? More like 11 million.**

Short Answers (1-2 paragraphs):

1. Why did America have a housing boom in the mid-2000s?

2. Why did the conditions that had been required for mortgage borrowers before 2000--20% down payment, evidence of a stable job, no more than a 33% ratio of housing expenses (including utilities and taxes) to income--disappear in the 2000s?

3. Why did the world economy fall into a very deep economic recession at the end of 2008?

4. What are the five (four positive, one negative) major components of GDP on the expenditure side?

5. Jean Baptiste Say in 1803 claimed that because nobody makes anything without intending to use it or sell it, and nobody sells anything without intending to buy something else, that there could be no general shortage of demand in an economy--that there could be a planned excess of supply of some commodities, but it would be balanced by a planned excess of demand of some other commodities. Was he wrong? Why was he wrong?

Problems:

1. Consider $\Delta Y = [\Delta A_0 + \Delta G - (I_r + X_\varepsilon \varepsilon_r)\Delta r]/(1-(1-t)c_y + im_y)$, the investment savings framework (with $\Delta A_0 = \Delta c_0 + \Delta I_0 - X_\varepsilon \Delta \varepsilon_0 + X_{y^*} \Delta Y^* + X_\varepsilon \varepsilon_r \Delta r^*$). Suppose the multiplier $1/(1-(1-t)c_y + im_y) = 1.5$, the responsiveness of exports to the exchange rate $X_\varepsilon = 500$, the responsiveness of the exchange rate to interest rates $\varepsilon_r=10$, and the responsiveness of investment to the interest rate $I_r = 1000$...

   a. Suppose that capital controls keep the exchange rate from responding to changes in the interest rate—suppose that $\varepsilon_r = 0$. If the interest rate falls by 3%, what happens to Y? **-1.5 x 1000 x -.03 = +45**
   b. Suppose that the responsiveness of the exchange rate to changes in the interest $\varepsilon_r = 1$. If the interest rate falls by 3%: what happens to Y? **-1.5 x (1000 + 500 x 1) x -.03 = +67.5**
   c. Suppose that the responsiveness of the exchange rate to changes in the interest $\varepsilon_r = 5$. If the interest rate falls by 3%, what happens to Y? **-1.5 x (1000 + 500 x 5) x -.03 = +157.5**
   d. Suppose that the responsiveness of the exchange rate to changes in the interest $\varepsilon_r = 20$. If the interest rate falls by 3%what happens to Y? **-1.5 x (1000 + 500 x 20) x -.03 = +495**

e. Explain the similarities and the differences between your answers to (a)-(d). **As exchange rates become more sensitive to the interest rate, the swings in exports caused by interest rate changes become bigger and that induces larger swings in GDP.**

2. Consider $\Delta Y = [\Delta A_0 + \Delta G - (I_r + X_\varepsilon \varepsilon_r)\Delta r]/(1-(1-t)c_y + im_y)$, the investment savings framework (with $\Delta A_0 = \Delta c_0 + \Delta I_0 - X_\varepsilon \Delta \varepsilon_0 + X_{y^*} \Delta Y^* + X_\varepsilon \varepsilon_r \Delta r^*$). Suppose the multiplier $1/(1-(1-t)c_y + im_y) = 1.5$, the responsiveness of exports to the exchange rate $X_\varepsilon = 500$, the responsiveness of the exchange rate to interest rates $\varepsilon_r=10$, and the responsiveness of investment to the interest rate $I_r = 1000$...

   a. What happens to Y if the real interest rate r goes up by 1%, and if speculator confidence in the currency goes down by 20%? **1.5 x -500 x -.2 + 1.5 x -(1000 + 500 x 10) x .01 = 150 – 90 = 60**
   b. What happens to Y if the real interest rate r goes up by 3%, and if baseline investment spending goes down by 200? **1.5 x -200 + 1.5 x -(1000 + 500 x 10) x .03 = -300 – 270 = -570**
   c. What happens to Y if the real interest rate r goes down by 2%, and if speculator confidence in the currency goes up by 10%? **1.5 x -500 x .1 + 1.5 x -(1000 + 500 x 10) x -.02 = -75 + 180 = 105**
   d. What happens to Y if the real interest rate r goes up by 1%, and if baseline consumption spending goes up by 100? **1.5 x 100 + 1.5 x –(1000 + 500 x 10) x .01 = 150 – 90 = 60**

3. NIPA: Explain whether or not, why, and how the following items are included in the calculation of GDP:

   a. The sale for $25,000 of an automobile that cost $30,000 to manufacture that had been produced here at home last year and carried over in inventory. **30000 in inventory investment last year. -30000 in inventory investment this year plus 25000 in consumption spending this year for a total of -5000.**
   b. The sale for $35,000 of an automobile that cost $25,000 to manufacture newly-made at home this year. **35000 of consumption spending.**
   c. The sale for $45,000 of an automobile that cost $30,000 to manufacture that was newly-made abroad this year and imported. **45000 of consumption spending this year minus 30000 of imports this year for a net of 15000**
   d. The sale for $50,000 of an automobile that cost $30,000 to manufacture that was made abroad and imported last year. **30000 of inventory**

investment last year minus 30000 of imports last year for a net of zero; 50000 of consumption spending this year and -30000 of inventory investment this year for a net of 20000.

4. Suppose that an economy's production function is $Y=K^{\alpha}(EL)^{(1-\alpha)}$ with $\alpha=0.5$; suppose further that the savings rate s is 40% of GDP, that the depreciation rate δ is 4% per year, the population growth rate n is 0% per year, and the rate of growth g of the efficiency of the labor force is 2% per year.

a. What is the steady-state balanced-growth capital-output ratio? **40/(4+0+2) = 6 2/3.**
b. How fast does output per worker grow along the steady-state balanced-growth path? **At 2% per year.**
c. How fast does total output grow along the steady-state balanced-growth path? **Since population growth is zero, at the same pace as output per worker.**

5. Developing Country: In the 1950s Developing Country's savings rate averaged 24.5% of GDP. In 1960 its level of GDP per capita was $3600 of today's dollars per year. Since 1980 its savings rate has averaged 24.5% of GDP. Today its level of GDP per capita is $2600 per year. Assume that the diminishing-returns parameter α in our production function is 0.5, that its population growth rate n has been constant at 3% per year, and that its depreciation rate δ has been constant at 4.64% per year. Assume that Developing Country was on its pre-1960 steady-state growth path in 1960 and is on its post-1960 steady-state growth path now.

a. Suppose there had been no growth in the efficiency of labor in Developing Country between 1960 and 2011, what do you predict that the level of GDP per capita would be in Developing Country today? **If the efficiency of labor is not growing, then the capital-output ratio is stable at 24.5/(4.64+3) = 3.21. And then output per worker today would be 3600. It isn't, so efficiency of labor growth is negative.**
b. How fast has the efficiency of labor grown over the past 50 years? **Since nothing has changed to change the capital-output ratio, the rate of growth of output per worker is the same as the rate of growth of the efficiency of labor. (ln(2600) – ln(3600)) / 50 = -0.64%/year**
c. What was the value of the efficiency of labor in 1960? **With a g of -0.64%/year, the capital-output ratio is 24.5/(3%+4.64%-.64%) = 3.5. So the efficiency of labor in 1960 was 3600/3.5 = 1030**
d. What is the value of the efficiency of labor today? **1030 x (1 - .64)^50 = 750**

6. In the simple income-expenditure model with real GDP Y equal to the sum of consumption spending by households C, investment spending by businesses I, government purchases G, and with net exports NX; with consumption spending C given by the equation: where $Y = C + I + G + NX$ and $C = c_o + c_y Y(1-t)$; and with imports IM given by the equation: $IM = im_y Y$...

a. Suppose I = \$2 trillion, G = \$2 trillion, GX = \$2 trillion, c_o = \$3 trillion, c_y = 0.75, the tax rate t=0, and im_y = .15. What is GDP Y? **Multiplier = 2.5; 2.5 x 9 = 22.5**

b. Suppose I = \$2 trillion, G = \$3.5 trillion, GX = \$2.5 trillion, c_o = \$3 trillion, c_y = 0.9, the tax rate t=0, and im_y = .15. What is GDP Y? **Multiplier = 4; 4 x 11 = 44**

c. Suppose I = \$1.5 trillion, G = \$4 trillion, GX = \$2 trillion, c_o = \$3 trillion, c_y = 0.4, the tax rate t=0, and im_y = .15. What is GDP Y? **Multiplier = 1.33; 1.33 x 10.5 = 14**

d. Suppose I = \$2 trillion, G = \$2.5 trillion, GX = \$2.5 trillion, c_o = \$3.5 trillion, c_y = 0.5, the tax rate t=0, and im_y = .1666667. What is GDP Y? **Multiplier = 1.5; 1.5 x 10.5 = 15.75**