Econ. 4431. Macroeconomic Policy
Midterm exam
There are three sections. Please read the instructions at the beginning of each section.
Total Time allowed: 2 hours. Good luck!

Section 1. Answer all questions. Each is worth 15 points

1.1 Volkswagen (a German company) produces a car in Mexico paying local workers $1000. The car is then exported from Mexico to a US car dealer for $5000 (so Volkswagen makes a profit of $4000) and the dealer sells it to President Obama for $10000. Compute the impact of these transactions on the following variables: US GDP, GNP and Current Account, Mexico GDP, GNP and Current Account, Germany GDP, GNP and Current Account.

The total value produced is 10000. GDP tells you where it is produced: 5000 in Mexico and 5000 in US. GNP tells you who is earning the income associated to it: 1000 goes to Mexico (the wages) 4000 to Germany (profits of VW) and 5000 to US (the margin of the dealer), and CA tells you the flows of money from one country to the other.

US GNP: 5000 US GDP: 5000, US CA:-5000
Mexico GDP: 5000 Mexico GNP: 1000, Mexico CA: 5000-4000=1000
Germany GDP: 0 Germany GNP: 4000, Gemany CA=+4000

1.2 Assume that in year 2010 a country produces 10 cars and 5 bicycles. The CPI basket of that country includes 1 car, 2 bicycles and 10 gallons of gas (which are imported). Suppose that in 2010 the price of a car is 100$, the price of a bicycle 20$ and the price of a gallon of gas 1$. In 2011 the country produces 10 cars and 10 bicycles and the prices of cars and bicycles are unchanged but the price of a gallon of gas increases to 2$.
Compute the CPI and GDP deflator in 2010 and 2011. Explain why CPI inflation likely overstates the true cost of changing gas prices.

	CPI	Nom GDP	Real GDP	GDP Def
2010	1*100+2*20+1*10=150	10*100+5*20=1100	10*100+5*20=1100	1
2011	1*100+2*20+2*10=160	10*100+10*20=1200	10*100+10*20=1200	1

CPI overstates the true cost of changing gas prices because, being a fixed basket index, it does not take into account that when facing higher gas prices consumer will consume less gas.

1.3 Consider a country which has the following aggregate production function $Y=K^{0.5} L^{0.5}$.
Assume that the country saves 30% of its output and that capital in the country depreciates at 15% per year. Assume that population in the country is 1000 and that everybody works (so L=1000).
Plot the relation between capital per capita and output per capita.
Solve for steady state total GDP, GDP per capita and capital stock per capita.
Assume now that due to a too generous pension system 50% of the population stops working. Compute the new steady state output per capita.

-Standard Solow Graph (lecture 6, fig. 1)
-Solving for steady state yields $s*k^{0.5}$ =delta*k -> k=(s/delta)^2=4 where k is capital per capita
-Output per capita is 2 and total output is 2000.
- If 50% of the population stops working output per worker is unchanged but now total output is 2*500=1000 so output per capita is 1.

Section 2. Answer 4 of the following 5 questions. Each is worth 10 points

2.1 Some economists argue that US right now is under the danger of the "twin deficits" i.e. simultaneous large government deficit and large current account deficit. Explain why a large government deficit, keeping everything else constant, leads to a large current account deficit Suppose now that in together with the large government deficit there is also a large drop in investment. Would that also lead to a large CA deficit?

Use the equation that relates
S(p) + S(g) = I + CA
If government deficit is high the government saving S(g) is low so, keeping everything else constant, CA should fall. Notice though that if S(g) falls together with I a CA deficit does not necessarily ensue.

2.2 Briefly explain (with the use of the Solow Model) what is a poverty trap. (A clear graphical analysis is sufficient). Suggest a policy that can get a country out of a poverty trap.

Standard poverty trap graph (see lecture notes 6, figure 9). A massive inflow of capital from abroad

2.3 Consider one country in which there are two firms. Both firms produce bread using a so-called A-k technology, i.e. if a firm invests k units of capital it will produce Ak units of bread. For firm 1 A=1, for firm 2 A=2. Suppose you are a bank who has to allocate 10 units of capital between the two firms. Where would you allocate the capital? What would be the resulting TFP of the country? Suppose now the government passes a law stating that both firms should receive equal amount of capital. Compute TFP in this case.

I would allocate all capital to firm 2 and TFP would be 2. If the government passes the law TFP would 1.5.

2.4 Cuba has decided to start structural reforms. This leads to an immediate 20% increase in efficiency (TFP) in Cuba (but no further changes in TFP). Assess (qualitatively) the effects of the reform on the level of GDP, savings, investment, returns to capital and GDP growth in Cuba. Do you think that the long run effect on GDP will be larger or smaller than 20%. Briefly motivate your assessments.

If TFP increase 20% this would generate, on impact, a 20% increase in GDP, as TFP increases the efficiency of every factor of production. But the increase in TFP would also increase returns to capital and thus would increase investment and hence capital stock. This would generate positive GDP growth rate (in addition to the initial 20%) so that the long run effect of the reform on TFP will be larger than 20%

2.5 US has a GDP per capita of 40000$ and Germany has a GDP per capita of 40000Euros. The price of a given basket of goods and services is 1000$ in US and 1100Euros in Germany. The market exchange rate is 1.2 dollars per Euro. If you use the PPP exchange rate who has the highest GDP per capita?

PPP exchange rate equalizes the price of a basket so is 1.1 Euro per 1 dollar. So at PPP exchange rates US GDP per capita (40000) is higher than Germany (40000/1.1).

Section 3. Answer 3 of the following 5 questions. Each is worth 5 points

3.1 Suppose that in a given country there are 100 people. Everybody makes 1$ except Uncle Scrooge who makes 1000$. What are the 90/50 and the 50/10 ratios for that country?

90/50=1, 50/10=1

3.2 Saudi Arabia produces mostly oil and the world price of oil relative to other goods has been increasing over time. Do you agree with the statement that Saudi Arabia real GDP computed using base year method underestimates SA true value creation? Briefly explain why

Yes using the base year method increases in the price of oil are not reflected in GDP but the true value creation of GDP should include the fact that oil is over time a more valuable good.

3.3 You are pondering whether to invest in a country A or country B fund. The two countries look very similar with exception that country A has just signed a law that limits the number of children families can have and you will expect a decline in population growth in country A. On the basis of this information which fund would you pick? Why?

Ceteris paribus **returns to capital are lower in a country with higher capital per worker and so they are expected to be lower in country A, because the policy will increase capital per worker. Since, as an investor, you are interested in the returns to capital you should pick country B. Another way of seeing this is that wages are going to be lower in the country with more population so conditions for capital are more favorable**

3.4 The government debt of some European countries recently has been increasing substantially. The increase in debt has lead to an increase in interest rates paid by these governments. Why would an increase in debt lead to an increase in interest rate? And why an increase in interest rate might lead to a further increase in debt?

Higher debt leads to higher probability of default and hence higher interest rate. Higher interest rate increase future debt because countries have to pay more interest on the existing debt

Key equation is B' = B + (G+Tranf – Taxes) +r*B

3.5 If in a given month labor force participation increases and employment stays constant what would happen to unemployment rate?

It will increase as U=(LF-E)/LF = 1-E/LF