A. Open-Economy Macroeconomics

1) Introduction (national income accounting for an open economy)

a) Discuss the concepts of: gross national product (real and nominal), gross domestic product and the relationship between GNP and GDP.

b) In a closed economy the National Income Identity is \( Y = C + I + G \). Why is this an identity?

c) In an open economy only a part of domestic spending/domestic absorption \((C + I + G)\) generates domestic national income. Why?

d) Do exports \((EX)\) add to the national income of the domestic economy? What’s about imports \((IM)\)?

e) Show that a country’s current account balance \((NX = EX - IM)\) equals the change in its net foreign wealth.

f) Why is the current account also equal to the difference between national income and domestic residents’ spending (domestic absorption)?

g) Define the concept of national saving.

h) Discuss the relationship between saving and the current account.

i) On an island total annual crop is 100 bushels of wheat. Citizens of this island consume 55 bushels of wheat and 40 gallons of milk, which is imported from the neighbor island. Farmers on this island invest (as seed) 25 bushels of wheat and the government appropriates 10 bushels of wheat to feed the professors of this island. Ten bushels are exported. The price of milk is 0.5 bushel of wheat per gallon. GNP in terms of wheat is? Total consumption/import/export in terms of wheat is? How can it be, that total domestic spending is greater than GNP?

j) Ronald Reagan slashed taxes and raised government expenditures. Why those events gave raise to the argument that government and current account deficits were “twin deficits”.

k) After 1999 European governments made frantic efforts to cut government spending and raise taxes. Why didn’t increase the EU’s current account surplus sharply? (Hint: private saving, Ricardian equivalence).

l) Discuss the economic implications of a huge current account surplus in the case of unemployment.

m) A country’s balance of payment account keep track of both its payments to and its receipts from foreigners: Give three examples of international transactions which are recorded in the balance of payment.

n) Give three examples of an asset.

o) You can reduce the balance of payment accounts to the current account and the financial account. Explain the rule of double-entry bookkeeping and give an example of paired transactions. Give three examples of economic transactions which are recorded in the financial account.
p) The selling of domestic assets to foreigners is an import or an export of assets? It is a financial/capital inflow or financial/capital outflow?
q) You know what official international reserves are? Give an example of an official foreign exchange intervention. What happens to the money supply?

2) The real exchange rate ($\lambda$)

a) Define the concept of the real exchange rate $\lambda_{e/s}$ (definition, real depreciation, real appreciation, relative price, purchasing power of an € within Europe’s borders relative to its purchasing power within the United States).
b) Assume GNP=GDP: Explain Y, C, I and S in a very simple economic model of a little country (r is given by the world market). Assume further, that in the market for loanable funds we have positive net foreign investment (NFI). Explain, why in the market for foreign exchange the real exchange rate is given by (net export) $\text{NX}(\lambda_{e/s})=\text{NFI}(-r)$.
c) Assume political unrest/pessimistic economic expectations/optimistic economic expectations/higher government expenditures/lower government expenditures in Euroland. How can an equilibrium be restored in the market for loanable funds and the market for foreign exchange?
d) The real exchange rate in the very long run can be important for the “intertemporal budget constraint” of a country. Why?
e) Why are nontradeable goods very important for the real exchange rate?
f) Why are price levels lower in poorer countries? Why are nontradeable good so expensive in Japan?
g) What is the economic meaning of “Dutch disease”?

3) Money and the nominal exchange rate

a) You know, the exchange rate $E_{e/s}$ can be quoted in two ways: as the price of the foreign currency in terms of the euro (“American terms”), or foreign currency units per euro (“European terms”). If you have all relative prices (exchange rates) of your currency, what are you able to do?
b) Who are the main actors in the foreign exchange market?
c) What are spot exchange rates, forward exchange rates and foreign exchange option? Why are they useful?
d) Why is the interest parity the basic equilibrium condition in the foreign exchange market? Give an example of an expected rate of appreciation/expected rate of depreciation.
e) Show that the difference between the dollar returns for two assets must equal the difference between their real returns.
f) What is the effect on today’s euro/dollar exchange rate of a rise in the expected future euro/dollar exchange rate or a rise in the US interest rate?
g) Mention at least two functions of money.
h) Why are the interest rate, the price level and real national income important determinants of the aggregate money demand?

i) What is the monetary base (M 1)?

j) A balance sheet for the central bank of an imaginary country is shown below:

<table>
<thead>
<tr>
<th>Central Bank Balance Sheet</th>
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<tbody>
<tr>
<td><strong>Assets</strong></td>
</tr>
<tr>
<td>Foreign Assets</td>
</tr>
<tr>
<td>Domestic Assets</td>
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k) Give two examples of foreign assets and domestic assets.

l) Currency in circulation is considered a central bank liability. Why?

m) Suppose the central bank goes to the foreign exchange market and sells 100 Euro worth of foreign bonds for Euro. What happens to the money supply?

n) Show that a 100 Euro purchase of foreign assets by the central bank would cause its liabilities to increase by 100 Euro. What happens to the money supply?

o) Show that a 100 Euro purchase of gold by the central bank would increase its liabilities by 100 Euro as well. What happens to the money supply?

p) Recall that when the central bank buys assets the accompanying increase in the money supply is generally larger than the initial asset purchase because of money multiplier effects. Why? (Hint: look at the multiple deposit creation within the private banking system).

q) Show in a simple diagram of a money market equilibrium that the money supply can be determined by the central bank if the central bank is pegging the interest rate.

4) Price levels and the exchange rate in the long run

a) The purchasing power parity (PPP) states that the exchange rate between two countries currencies equals the ratio of the countries price levels. What is the basic idea of PPP? What about the empirical evidence on PPP? Why all versions of the PPP theory do badly in explaining the facts?

b) Absolute PPP implies a proposition known as relative PPP. Why?

c) Discuss the implications of the absolute und relative PPP for the real exchange rate. (Hint: calculate the growth rate of the real exchange rate).

d) Why is the real exchange rate an additional determinant of the the nominal exchange rate? (Hint: Recall our definition of the real Euro/Dollar exchange rate and solve this equation for the nominal exchange rate).

e) What means the “Fisher Effect”?

f) Assume that the prices of goods are perfectly flexible. The EZB raises the future rate of Euro money supply growth by the amount \( \Delta \pi \). What happens to the interest rate, the price level, the exchange rate and the money demand?
g) What is the expected change in the real exchange rate?

h) What happens to the international interest rate gap when the market expects relative PPP not to prevail.

5) Fixed exchange rates and foreign exchange intervention

a) Explain: “managed floating”, “regional currency arrangements”.

b) Explain the policy of “sterilized foreign exchange intervention”. (Hint: Use the Central Bank balance sheet).

c) Output (Y) rises. Show, that the central bank must raise the money supply to fix the exchange rate. (Hint: use the diagrammatic tool which is linking money, the interest rate and the exchange rate).

d) Why are central bank monetary policy tools powerless to affect economy’s money supply or its output under a fixed exchange rate?

e) Show, that to hold the exchange rate fixed at a certain level after the market decides it will be devalued, the central bank must use its reserves to finance a private financial outflow that shrinks the money supply and raises the home interest rate. (Hint: use the diagrammatic tool which is linking money, the interest rate and the exchange rate).

6) The international monetary system 1870-1993

a) Macroeconomic policy goals in an open economy are internal balance and external balance. What’s that?

b) Under a Gold Standard, central banks peg the prices of their currencies in terms of gold and hold gold as official international reserves. Show that the Gold Standard results in fixed exchange rates. (Hint: take as an example 20 Euro per ounce Gold and 10 Dollar per ounce gold. Assume an exchange rate of $E_{€/}$ = 1€/1$ and no cost of shipping gold. Can this be an equilibrium? Discuss the arbitrage process and the consequences of this arbitrage process for this exchange rate and the money supply in both countries).

c) Suppose there is a Gold Standard between Euro and Dollar. The Europäische Zentralbank (EZB) decides to increase its money supply through a purchase of domestic assets.
   - What happens to the price level and the interest rate in Euroland?
   - What are the consequences for the current and financial accounts?
   - What happens to the exchange rate?
   - What arbitrage process is now possible?
   - What is the result for the money supply in Euroland?
   - What is the price-specie-flow mechanism? (Hint: in the 18th century precious metals were referred to as “specie”).

d) Under Gold Standard, we have a symmetric monetary adjustment. Why?

e) Mention three examples of benefits and drawbacks of the Gold Standard.
f) Only for very interested students! You know the children’s book “The Wonderful Wizard of Oz”? You will realize that the story of Dorothy, Toto and their friends is an allegorical rendition of the U. S. political struggle over bimetallic monetary standard.

g) In the case of Gold Standard/Bretton Wood System a country is said to be in balance of payment equilibrium when the sum of its current, capital, and nonreserve financial accounts equals zero. Why are reserve financial accounts so important in these exchange rate systems?

h) The system set up by the Bretton Wood agreement called for fixed exchange rates against the U. S. dollar and an unvarying dollar price of gold $ 35 an ounce. Member countries held their official international reserves largely in the form of gold or dollar assets and had the right to sell dollars to the federal Reserve for gold at the official price.

- In 1965 US government military purchases began rising (Vietnam War). These expenditures were not matched by tax increases. Prices increased and there was a sharp fall in the U. S. current account surplus. Why?
- What was the consequence for the E$_{DM/S}$ exchange rate?
- The Deutsche Bundesbank fixed the exchange rate. What happened to the DM price level?
- Assume the Deutsche Bundesbank is expanding the monetary base. What will be the result? (Hint: $M_0$ increases, $r_D$? $E_{DM/S}$? official international reserves? $M_0$?).
- Assume the Federal Reserve Bank (FED) is expanding the monetary base. What will be the result in USA and all the major European currencies?
- Show that the center country in a reserve currency system bears none of the burden of financing its balance of payment (“The asymmetric position of the reserve center”).
- If the international reserves (Dollars) of the European central banks grow until they exceed the US. gold stock there is a confidence problem. Why?
- The Bretton Wood system promise you an ounce of gold at the price 35 $. You expect next years a price of 70 $ for an ounce of gold. What will you do? What do you expect for the gold price? (Hint: remember you are studying MBA and want to get rich. That’s the reason why you will use every arbitrage possibilities).
- In the early 1970 there was a speculative attack against the Deutsche Bundesbank and the Bretton Woods system collapsed. Why?

i) The waste and hardship that occur when resources are underemployed is (should be) clear. If an economy is “overheated” and the resources are “overemployed” waste of different kind occurs. Give some examples.
j) International economic textbooks often identify external balance with balance in a country’s current account. The Baltic countries that joined the EU in May 2004 are running high current account deficits. Explain in this context why the \textit{optimal level of the current account} (NX) can be positive or negative.

k) The next diagram (“\textit{four zones of economic discomfort}”) shows what different levels of the exchange rate and fiscal ease imply for employment and the current account.

- Along II output is at its full-employment level. Why?
- Along XX, the current account is at its target level, X. Why? (Hint: \(NX(EP^*/P, Y-T)=X\); the current account is an increasing function of the real exchange rate \textbf{and} a decreasing function of \textit{disposable income} (Y-T). An increase in disposable (income minus taxes) is increasing import.
- Notice that monetary policy is not a policy tool under fixed exchange rates. You can change the fiscal policy (\textit{expenditure-changing policy}) and alter the level of economy’s total demand for goods and services, or you can alter the exchange rate (\textit{expenditure-switching policy}) and change the direction of the demand, shifting it between domestic output and imports. Explain the economic situation in point 2 and 1.
- Under the Bretton Woods rules, \textit{exchange rate changes were supposed to be very infrequent}. This left \textit{fiscal policy} as the main tool for moving the economy toward internal and external balance. Show that policy makers found themselves in point 2 in a \textit{dilemma situation}. (Hint: \textit{contractionary fiscal policy} brings you to 4, \textit{expansionary fiscal policy} brings you to 3).
7) Macroeconomic policy and coordination under floating exchange rates

a) Give at least two **benefits of floating exchange rates**.
b) Give at least two **benefits of fixed exchange rates**.
c) There are two countries, Home and Foreign, and each country has two policy options, a **very restrictive** monetary policy and a **somewhat restrictive** policy. In 1981 a contractionary monetary policy of the industrial countries throw world economy into a deep recession. Why?
d) A government that adopts a less restrictive monetary policy than its neighbors is likely to face a currency depreciation that partially frustrates its attempts to disinflate. Why?
e) There are two countries, Home an Foreign, and each country has two policy options, a very restrictive monetary policy and a somewhat restrictive monetary policy. The following matrix shows the hypothetical effects of different monetary policy moves on inflation and unemployment. Each row corresponds to a particular monetary policy decision by Home and each column to a decision by Foreign. The boxes contain entries giving changes in Home and Foreign annual inflation rates ($\Delta \pi, \Delta \pi^*$) and unemployment rates ($\Delta u, \Delta u^*$). Under somewhat restrictive policies, inflation rates fall by 1% and unemployment rise by 1% in both countries. If Home suddenly shifts to a very restrictive policy while Foreign stands pat, Home’s currency appreciates, its inflation drops further, and its unemployment raises. Why? Home’s additional monetary contraction has two effects on Foreign. Foreign currency depreciates and the unemployment rate falls. That’s the reason why the Foreign inflation goes back up to its pre-disinflation level. Why? Home’s sharper monetary crunch therefore has a beggar-thy-neighbor effect on Foreign, which is forced to import some inflation from home.

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<td>Somewhat restrictive</td>
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<tr>
<td><strong>Home</strong></td>
<td>$\Delta U^* = 1%,$ $\Delta \pi^* = -1%$</td>
</tr>
<tr>
<td></td>
<td>$\Delta U = 1%,$ $\Delta \pi = -1%$</td>
</tr>
<tr>
<td><strong>Very restrictive</strong></td>
<td>$\Delta U^* = 0.5%,$ $\Delta \pi^* = 0%$</td>
</tr>
<tr>
<td></td>
<td>$\Delta U = 1.75%,$ $\Delta \pi = -2%$</td>
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</table>
f) To translate the outcome of this matrix into a policy payoff, we assume each government wishes to get the biggest reduction in inflation at the lowest cost in terms of unemployment. Each government wish to maximize $-\Delta \pi / \Delta U$.

g) The payoff matrix for different monetary policy moves is:

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<td>Home</td>
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<td></td>
<td>8/7</td>
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h) Without policy coordination, each country picks the policy that maximizes its own payoff given the other player’s policy choice. What’s the result? Show, that this result is an other example for the Prisoner’s Dilemma.

i) The superior outcome in the upper-left corner of the matrix can accur by what?

8) **Optimum currency areas and the European experience**

a) In the **European Monetary System (EMS)** the **Deutsche Bundesbank** had a monetary dominance. Why?

b) Why did policy makers in Italy **gained credibility** by placing monetary policy decisions in the hands of the inflation–fearing **German central bank**?

c) What has driven **European monetary cooperation**?

d) Mention at least three **Masstricht convergence criteria**.

e) The **European System of Central Banks (ESCB)**, which conducts monetary policy for the euro zone, consists of ….? (Hint: textbooks are not always at the actual level).

f) The **Stability and Growth Pact (SGP)** tightens the fiscal straitjacket further. The SGP sets out….?

g) The **theory of optimum currency areas** predicts that fixed exchange rates are most appropriate for areas **closely integrated** through **international trade and factor movements**. For example Norway might approach the decision for whether to join the euro zone or to peg the krone to the euro. The next simple diagram clarifies Norway’s choice:
Gains and losses for the joining country

The schedule GG shows how the potential gain to Norway from joining the euro zone depends on Norway’s degree of integration with the euro zone.

Give examples for “degree of integration”.

Give examples for the monetary efficiency gain from pegging the krone to the euro.

The schedule LL shows the economic stability loss from pegging the krone to the euro. Name two advantages of a floating exchange rate over fixed exchange rates when the economy is disturbed by a change in the output market (lower aggregate demand).

Assume the euro/ dollar exchange rate (€/$) depreciates. What happens in this chase to the krone/dollar rate (Krone/$) if the krone is pegged to the Euro?

Why has Norway a serious problem when it alone faces a fall in demand? How will full employment in Norway be restored in this case?

How mobile is Europe’s labor force compared to US labor force? You know some figures about the intra- EU trade as a percent of EU GDP?

9) **Developing countries: growth, crisis and reform**

a) Developing countries are characterized by the following features........?

b) Why have developing countries accumulated such high levels of international reserves?

c) In a currency board the monetary base is backed -there is a monetary low- entirely by foreign currency. The note-issuing authority announces an exchange rate against some foreign currency and , at that rate, simply carries out any trades of domestic notes against the foreign currency that the public initiates. The currency board is prohibited by law from acquiring any domestic assets. The
primary role of the central bank could be performed as well by a vending machine. Estonia and Lithuania, with no recent track record of monetary policy after decades of Soviet rule, hoped to establish low-inflation reputations by setting up currency boards. Why?

d) In a currency board monetary policy cannot be abused by politicians. You see any disadvantages? (Hints: Argentina, with its experience of hyperinflation mandated a currency board rule in its 1991 Convertibility Law. Later there was a financial panic in Argentina. In developing countries monetary policy can have effects, even with a fixed exchange rate, because domestic interest rates are not tightly linked to the world market).

e) In Argentina financial panic put the government under pressure to abandon the currency board link altogether. If markets anticipate the possibility of devaluation, some of the potential benefits of a currency board will be lost. You think, Argentina should adopt a **policy of dollarization**?

f) **Case Study: Chinas undervalued currency.** The next figure is entirely analogous to the figure in chapter 6, except that the horizontal axis measures total absorption A.

g) Absorption measures……? (Hint: look at question 1.c).

h) An appreciation of the Renminbi is shifting demand abroad by raising imports and lowering exports. Show that the full employment line (II) must have a negative slope. Hint: (Y=A+CA).

i) Explain the economic situation in point 1 and 2. What **policy package** moves the economy to both internal and external balance?

j) China’s savers put aside more than 45 % of GNP every year. You have some explanations for this staggering number?

k) Why are Chinas leaders so cautious to appreciate their currency?

Exchange rate E

\[
\begin{align*}
\text{XX} & \quad 1 \\
\text{II} & \quad 2 \\
A & = C + I + G
\end{align*}
\]
B. International Trade Theory

a) The technology of Home’s economy can be summarized by labor productivity in each industry, expressed in terms of the unit labor requirement, the number of hours of labor required to produce a pound of cheese or a gallon of wine ($a_{LC}, a_{LW}$). For example, it might require one hour of labor to produce a pound of cheese, two hours to produce a gallon of wine ($a_{LC}=1, a_{LW}=2$). Abroad it might require six hours of labor to produce a pound of cheese, three hours to produce a gallon of wine ($a_{*LC}=6, a_{*LW}=3$). What are the opportunity cost of a pound of cheese in terms of wine for Home’s economy and Foreign’s economy?

b) If $Q_W$ is the economy’s production of wine and $Q_C$ its production of cheese, then the labor used in producing wine will be $a_{LW}Q_W$, and the labor used in producing cheese will be $a_{LC}Q_C$. Show that $a_{LC}Q_C + a_{LW}Q_W = L$ is an equilibrium condition for the labour market.

c) Show that $a_{LC}Q_C + a_{LW}Q_W = L$ is the production possibility frontier and gives you the opportunity costs of a pound of cheese in terms of wine for Home’s economy.

d) Only when $P_C/P_W$ is equal to $a_{LC}/a_{LW}$ will both goods be produced. (Why?) What is the significance of the number $a_{LC}/a_{LW}$?

e) Home will specialize in the production of cheese if $P_C/P_W > a_{LC}/a_{LW}$. (Why?)

f) Assume: ($a_{LC}=1, a_{LW}=2$), ($a_{*LC}=6, a_{*LW}=3$) What are the goods exported by Home and Foreign?

g) Assume: world equilibrium $P_C/P_W=1$. Show that for Home this indirect method of “producing” a gallon of wine is a more efficient method than direct production. Show the same for Foreign (indirect producing cheese).

h) Another way to see the mutual gains from trade is to examine how trade affects each country’s possibilities for consumption. Hint: use the production possibility frontier.

i) Suppose that a pound of cheese and a gallon of wine both sell for $12; what is the relative wage of Home workers compared with Foreign workers? Compare this relative wage with the productivity of both countries.

j) Discuss the following misconceptions about comparative advantage: Free trade is beneficial only if your country is strong enough to stand up to foreign competition. Foreign competition is unfair and hurts other countries when it is based on low wages. Trade exploits a country and makes it worse off if its workers receive much lower wages than workers in other nations.

We have two regions (north, south), with 3 production sectors (high tech, medium tech, low tech). Labour is the only input. The numbers in the matrix give you the hours you need for one unit to produce. We assume, that there is a direct competition between S and N in the medium sector and the north specialized in the production of high-tech goods and the south in the production of low tech goods. Assume, the nominal wage in the north is 10 Euro per hour. What you know about the wage in the south (in Euro)? How can you see the benefits of trade by the principle of indirect production?
benefits you see for the north if we have technical progress in the low tech sector of the south? Assume the north has lost the medium sector because of an enormous technical progress in the south medium sector. What benefit effects you see for the south and the north in this case? You see a problem of unemployment in the long run for the the north?

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<th></th>
<th>high tech</th>
<th>medium tech</th>
<th>low-tech</th>
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<tbody>
<tr>
<td>Nord</td>
<td>3</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Süd</td>
<td>30</td>
<td>25</td>
<td>18</td>
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k) The Heckscher Ohlin model shows that comparative advantage is influenced by the interaction between nations’ resources (the relative abundance of factors of production). Give an example. What is the general conclusion about the income distribution effects of international trade in the Heckscher Ohlin model?

l) Please discuss in a simple model the main consequences of more trade between China and the EU for the textile and machinery industry if textiles are produced with a lower K/L than industrial goods and the K/L is higher in the EU (the development of relative prices of textile goods and industrial goods, the development of w/r in China and the EU). You think, that more trade with developing countries is a good reason for the high unemployment in Europe?

m) Please discuss the main principles of a market with monopolistic competition (Graphik equilibrium, there are fix costs, number of firms). Assume, we have a bigger market. What consequences you see for the main data of the market? Discuss the benefits of trade in the case of economies of scale and differentiated products. (Hint: use the demand and cost curves: \( Q_i = S \left[ \frac{1}{n} - b (P - P^*) \right] \), \( AC = \frac{F}{Q} + c \).

n) Use the concept of consumer surplus and producer surplus measuring the costs and benefits of a tariff, export subsidy, Europe’s Common Agricultural Policy and the effects of the U.S. import quota on sugar.

o) Discuss at least two reasons why a tariff can have losses for a country

p) Please discuss the main principles and problems of ”the prisoner dilemma” in the context of free trade versus protectionism and the benefits of negotiations.

q) Please discuss the main principles and problems of the strategic trade policy