STOCKHOLMS UNIVERSITET
Nationalekonomiska institutionen HT12

Intermediate Macroeconomics, 7.5 ECTS

SEMINAR EXERCISES

SEMINAR 1. *Mankiw: chapters 3, 5 and 7. EEAG Report: chapter 1. (Lectures 1-2).*

Question 1

Assume that the production function is $Y = F(K,L)$, where Y = output, K = capital and L = labour!
Assume that K and L are constant! Demand for goods and services in the economy is given by $C + I + G$, where C = private consumption, I = investment, and G = government expenditure. Assume also that consumption is a function of disposable income only, i.e. $C = C(Y - T)$, where T = taxes!

a) What is the relationship between saving and the real interest rate in such an economy?

b) How is the equilibrium in the economy determined if investment depends on the real interest rate r, i.e. $I = I(r)$?

c) What happens to the components of the demand for goods and services if T increases? What mechanism brings the economy back to equilibrium?

d) What happens to the level of investment if there is a downward shift in the investment schedule?

Question 2

Now, assume instead that we have an open economy! Saving in the economy is given in the same way as in Question 1. Furthermore, assume that the world interest rate is higher than the autarchy interest rate in the domestic economy (the interest rate the country would have had if the economy was closed)!

a) How high is investment and saving in this economy? Explain how investment and saving are related to each other and compare with a closed economy!

b) Does the trade balance show a surplus or a deficit?

c) Discuss how the model above can be used to explain why a country such as Germany has a trade balance surplus! What are the implications for the real exchange rate?

Question 3

Assume that the production function for an economy is $Y = AK^{0.3}L^{0.7}$, where Y = GDP, A = total factor productivity, K = the real capital stock and L = employment.

a) Use the production function to derive an equation showing how the GDP growth rate depends on the growth rates of total factor productivity, capital and employment!

b) Show how the profit-maximising level of employment is determined!

c)   What is the rate of GDP growth if the capital stock increases by 1 percent, employment decreases
     by 1 percent and total factor productivity increases by 1.5 percent?

d)   At what rate will the real wage increase? (Help: Use the condition showing the profit-maximising
     level of employment to derive this).

Question 4

Assume that demand for goods and services in a closed economy is comprised of consumption and
investment! In equilibrium we have:

$$Y = C + I.$$

Moreover, assume that the consumption function is given by:

$$C = (1 - s)Y.$$

Thus, individuals save a given fraction of their income, s, and consume the rest. Furthermore, assume that
the rate of depreciation is δ and the rate of population growth is n.

a)   Describe the long run equilibrium (steady state) in this economy! Explain why the capital stock
     per worker is constant in long-run equilibrium!

b)   How is output and capital per worker affected if the savings rate (s) is increased?

c)   What is the optimal level of capital given by the golden rule in a steady state? What can be done to
     reach it?

d)   What happens to capital per worker and output per worker in a steady state if the rate of
     depreciation increases? Explain intuitively!

SEMINAR 2. *Mankiw: chapters 6-8. Swedish Fiscal Policy: chapter 5. (Lectures 2-3).*

Question 1

Assume that we have a Solow model of the same type as in the previous seminar, but that we also include technological progress in the model! We model this by measuring labour efficiency with a parameter E. The production function is then

$$Y = F(K, L \cdot E)$$

Here $L \cdot E$ can be interpreted as efficiency units of labour.

a) Derive output per efficiency unit of labour as a function of capital per efficiency unit from the production function!

b) Assume that the rate of growth of labour efficiency is g percent and the rate of growth of population n percent! Explain what the long run equilibrium is in this expanded Solow model! Illustrate how output and capital per efficiency unit of labour is determined! What will be the growth rates of output and output per capita in equilibrium?

c) Explain what is meant by endogenous growth!

Question 2

Assume that we have an economy where a certain share (f) of the unemployed (U) manage to find work during a given period of time! Assume also that a certain share (s) of the employed are separated from their jobs every period! Denote employment by E and the total labor force by L!

a) Derive an expression for the unemployment rate (U/L) in a steady state! What is unemployment if $s = 0.02$ and $f = 0.25$?

b) Repeat the exercise for $f = 0.15$!

c) Are there any objections to describing the labour market in this way?

Question 3.

Now, assume instead that the unemployed can be divided into two groups: "easy to place" and "hard to place"! The number of "easy to place unemployed" is denoted U_1 and they find work with probability f_1. The number of "hard to place unemployed" is denoted U_2 and they find work with probability f_2, where $f_2 < f_1$. L is the total labor force. A given fraction s of the employed are losing their job each period.

a) Derive an expression for total unemployment in a stationary equilibrium $(U/L = (U_1 + U_2)/L)$!
   Assume that a fraction g of the unemployed is hard to place!
   (Hint: The flows in and out of U have to be equal in a steady state. U/L is to be expressed in terms
   of s, g and f.)

b) What is unemployment if $s = 0.02$, $f_1 = 0.4$, $f_2 = 0.1$ and $g = 0.2$?

c) What happens to unemployment if the fraction of hard to place unemployed (g) increases to 0.5?

Question 4

There is a lot of emphasis on youth unemployment in the Swedish public debate.

a) It is, for example, often claimed that one out of four young people in Sweden is unemployed.
   Explain why this statement is incorrect!

b) How serious a problem should one regard youth unemployment to be in Sweden? Motivate your
   answer thoroughly!

Question 5

The introduction of an *earned income tax credit* in Sweden has been controversial.

c) Analyse the likely effects of the tax credit!

d) What are the argument in favour of the tax credit? What are the arguments against!

SEMINAR 3. *Krugman-Obstfeld-Melitz: chapters 14-18. (Lectures 4-6).*

Question 1

The so called Balassa-Samuelson effect is central for understanding the differences in price levels among countries with different levels of income. Explain mathematically why prices of non-tradables are higher in rich countries than in poor countries. What does this imply for the the overall consumer price index?

Question 2

The rate of inflation (the actual and the expected) is 8 percent in country A and 5 percent in country B. The real interest rate in country B is 1 percent.

a) What will the nominal and real interest rates be in country A if interest rate parity and relative PPP holds?

b) Now assume that interest rate parity still holds but that deviations from relative PPP are possible! What will the nominal and real interest rates be in country A given the above assumptions about inflation rates if the real exchange rate of country A is expected to depreciate by 10 percent?

Question 3

Discuss, with the help of Krugman-Obstfeld-Melitz' AA- and DD-curves, the effects of a contractive fiscal policy (a decrease in government spending) on the interest rate, the nominal and real exchange rates, output and the price level!

a) What are the effects of a *temporary* decrease in government spending?

b) What are the effects of a *permanent* decrease in government spending? Distinguish between the short run (fixed price level, variable output) and the long run (variable price level, output at its equilibrium level).

Question 4

Assume that investors in financial markets revise their exchange rate expectations and begin to believe in a stronger krona in the future than before.

a) Use the AA-DD model to explain how the current exchange rate and output in Sweden are affected!

b) Analyse how Riksbanken can stabilise domestic output through monetary policy!

c) Assume that the Swedish economy finds itself in a liquidity trap at the zero interest rate bound. What does this imply for the effectiveness of monetary policy? What can then be done by policy makers to raise output?

SEMINAR 4. *Krugman-Obstfeld-Melitz: chapters 18 and 20. Mankiw: chapters 13-15. EEAG: chapters 1-2 (Lectures 6-9).*

Question 1.

Ireland and Spain are now in deep economic crises after preceding booms with fast credit growth, house price bubbles and real appreciations.

a) Why could not monetary policy prevent the earlier booms? Explain the dynamics implied by the so-called Walters critique!

b) Could the countries have used other policies to counteract the earlier boom?

c) Ireland and Spain need to accomplish real depreciations. How can this be done within a monetary union? What are the problems involved?

Question 2

Greece, just like Ireland and Spain, needs a real depreciation. Is abandoning the euro an option? Analyse the pros and cons of such a step!

Question 3

a) Explain the meaning of a Taylor rule!

b) How should the *real* interest rate be adjusted to an increase in the inflation rate according to the Taylor principle? Explain the intuition!

Question 4

a) Write out the equation for the dynamic aggregate supply (DAS) curve!

b) Derive the equation for the dynamic aggregate demand (DAD) curve!

c) Draw the DAS and DAD curves!

d) Use the DAS-DAD framework to analyse the effects of a recessionary demand shock!

e) Use the DAS-DAD framework to analyse the effects of an upward revision of the central bank's inflation target!

SEMINAR 5. *Mankiw: chapters 15-17. EEAG: chapter 4. Calmfors and Wren-Lewis (2011). Calmfors (2012). (Lectures 9-10).*

Question 1

Assume that unemployment is a function of inflation according to the following expectations-augmented Phillips curve:

$$u = u^* - (\pi - E\pi)$$

where u^* is the natural (equilibrium) rate of unemployment and π^e is the expected (future) rate of inflation. Assume also that agents have correct expectations of the inflation rate and that the central bank's preferences are given by the "loss function":

$$L = u^2 + \lambda \pi^2,$$

where λ denotes the weight that the central bank puts on stabilising unemployment.

a)   Show what rate of inflation a central bank with the weight $\lambda = 1$ will choose! (Help: Minimise the loss function with respect to π taking the unemployment equation into account and taking the expected rate of inflation as given. After the first-order condition for a minimum of the loss function has been derived, insert $E\pi = \pi$ in the equation and solve for π)! Assume that the equilibrium rate of unemployment, u^*, is 0.05.

b)   Assume that a more "liberal" executive board of the central bank is appointed with instead the weight $\lambda = 0.5$ for inflation! What will be the new rate of inflation?

d)   What can we learn from the calculations above?

Question 2

Assume that the consumption of a household is based on both current income and the (expected) future income.

$$C_1 = Y_1 - S_1$$

$$C_2 = (1+r)S_1 + Y_2,$$

where C_1, Y_1 and S_1 are consumption, income and saving in the current period, C_2, Y_2 and S_2 are consumption, income and saving in the next period and r = real interest rate.

a) Derive the household's intertemporal budget constraint! Assume that the households' preferences are such that $Y_1 - C_1 < 0$! Illustrate the intertemporal equilibrium in a diagram!

b) Assume that the household becomes more optimistic regarding its future income! How will this affect consumption today and in the future?

c) Assume that the real interest rate increases! How will this affect the household's consumption decision?

Question 3

Assume that we have Ricardian equivalence. This implies that consumption depends on expected life-time incomes and that individuals understand the government's intertemporal budget restriction.

a) How will consumption be affected by a tax increase today if future government consumption is assumed not to be affected? Motivate your answer using the intertemporal budget restrictions that households and the government are facing!

b) Is Ricardian equivalence a reasonable description of reality? Does it seem to hold for the crisis countries in the eurozone?

Question 4

A heavily indebted government may end up in a vicious circle, where increasing debt leads to higher interest rates and lower growth, which increases debt even faster with subsequent even higher interest rates and lower growth etc.

a) Derive a formula showing how the change in the government debt ratio depends upon the primary deficit (relative to GDP), the earlier debt ratio, the real interest rate and the growth rate!

b) By how much will the government debt ratio increase in a given year if earlier debt is 100 per cent of GDP, the primary deficit is 5 per cent of GDP, the real interest rate is 5 per cent and output is constant (zero output growth). What primary fiscal balance is required to stabilise debt?

Question 5

a) Discuss why the fiscal rules in EU's stability pact were not respected!

b) Are the new rules that have been adopted or are in the process of being adopted more likely to be respected?

c) Discuss to what extent fiscal councils can contribute to fiscal discipline!