Name ______________________________

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Group ______________________________

040185 UK Introduction to Macroeconomics

Midterm (15.04.2011)

Exercise	max. points	obtained points
1	30	
2	30	
3	40	
Total	100	

Good Luck!

Important: You have to show the **complete solution path** (i.e. also auxiliary calculations)! Parts you don't want to count must be crossed out clearly.

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1) (**30 Points**) An open economy consists of a firm that produces necessary consumer goods, many households, and a government. The households provide their labor force to the firm and receive a wage income. The member of one household owns the firm. The government taxes the production of the consumer good with a value added tax (VAT) of 10%. Annual production of the consumer good is 1000€ at basic prices, and thus 1100€ at market prices. The firm pays 900€ of wages to households, and the government additionally transfers its VAT revenues of 100€ to the households, who consume 1000€ of the domestically produced good every year and save nothing. 100€ of the good at market prices are exported. The firm uses its profits of 100€ to purchase an imported investment good that is invested into the firm. There are no further taxes besides the VAT.

   (a) (**10 points**) Determine the gross domestic product (GDP) and the gross national income (GNI) of this economy. Show that the basic identities $Y = C + I + G + X - IM$ and 'saving equals investment' are fulfilled. Note that $G = 0$. Who saves in this economy?

   (b) (**10 points**) Something happens. The firm owner, although preserving her citizenship, moves to a tropical beach and becomes a foreign resident. Instead of investing the profits, she simply spends it on foreign goods. Again, determine GDP and GNI and show that the two identities hold. Note that now $G = IM = I = 0$.

   (c) (**10 points**) The government nationalizes the firm, abolishes the 10% VAT, such that the market value of the firm production is now only 1000€ and again imports 100€ out of its profits to invest into the firm. Households receive no more transfers (besides wages) from the government and spend all their wages of 900€ on the consumer good. Again, evaluate GDP and GNI and both identities. Note that $G = 0$, as the government spending is not consumption.

Important: You have to show the **complete solution path** (i.e. also auxiliary calculations)! Parts you don't want to count must be crossed out clearly.

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2) (**30 Points**) Suppose that money demand is given by the following function:

$$M^d = \$Y\,(0.4 - i)$$

and that nominal GDP is given by \$ 2000. Moreover, assume that the monetary base is given by $H^s = \$80$.
It is also known that people in this economy hold 5% of their money holdings in form of cash and the rest in form of checkable deposits. Morevoer, banks must hold 10% of the money on checkable deposits as reserves. Bonds promise to pay \$ 100.

(a) (**8 Points**)Calculate the money multiplier and the overall supply of money. Interprete the value of the multiplier that you calculated.

(b) (**8 Points**) Calculate the money market equilibrium using that the supply and the demand for central bank money is equal. Also calculate the bond price.

(c) (**8 Points**) What happpens to the money market equilibrium if the central bank decides to increase the monetary base to $H^s = \$90$? How would the bond price change?
Explain the effects of this increase on the overall supply of money using the concept of the money multiplier.

(d) (**6 Points**) Suppose that the central bank targets an interest rate of 10%. What monetary base is necessary to achieve this goal?

Important: You have to show the **complete solution path** (i.e. also auxiliary calculations)! Parts you don't want to count must be crossed out clearly.

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3) (**40 Points**) Consider a closed economy described by the following behavioral equations in the short run:

$$\begin{aligned} C &= 100 + 0.5\,(Y - T) \\ T &= 100 + 0.2Y \\ I &= 150 + 0.1 - 500i \\ G &= 200 \\ \left(\frac{M}{P}\right)^d &= 4Y - 8000i \\ \left(\frac{M}{P}\right)^s &= 2000 \end{aligned}$$

(a) (**6 Points**) Explain why investment and money demand should depend on the interest rate and output.

(b) (**4 Points**) Explain why taxes should depend on output.

(c) What other definition and equilibrium conditions are needed to close the short-run model? Explain their meaning.

(d) (**8 Points**) Include those missing conditions in the model and determine the equilibrium level of private consumption and investment.

(e) (**8 Points**) Using the IS-LM diagram (with i on the vertical axis and Y on the horizontal axis), examine the *qualitative* short-run effects of a money supply contraction on private consumption and investment. Give the economic explanation for your results. (Note: you are supposed to examine whether they increase, decrease, or remain unchanged; no calculations are required.)

(f) (**4 Points**) Using the same IS-LM diagram, determine the *qualitative* short-run effects of an increase in government spending on the interest rate and output. Give the economic explanation. (Note: you are supposed to examine whether they increase, decrease, or reamin unchanged; no calculations are required.)

(g) (**4 Points**) Would the output effect in your answer to question (f) be larger or smaller (in absolute value) if taxes were fully exogenous (i.e. if they did not depend on income)? Give the economic explanation.