KYIV SCHOOL OF ECONOMICS

Applied Macroeconomics I, 2013

Instructor: Maksym Obrizan

HOMEWORK 1 by _____(First and Last Name)

Due: Submit homework electronically or as a hard copy any time prior to class on Monday, September 16th. Homeworks submitted 10 minutes after class begins **will have reduced scores**.

Instructions: Answer all questions to the best of your knowledge in the space provided. Each problem has the same weight for a total of 100 points. Similarly, all parts within each problem are equally weighted. To get full credit **always show your calculations** and not just answers.

I. Nominal government debt in Poltavia is equal to 1200 dollars. The following investment project is currently under consideration in the parliament of the republic. It requires investment of 120 dollars in 2011, 240 dollars in 2012, 175 dollars in 2014. This project will repay 100 dollars in 2012, 200 dollars in 2013 and 400 dollars with probability 1/2 and 100 dollars with probability 1/2 in 2014.

1. Suppose that the project is funded through budget deficit and its proceeds will constitute budget surplus. If the project is funded, what will be government debt by the end of 2014? Show the calculations.

2. Suppose that interest rates are known to be 10% in 2011, 5% in 2012, 5% in 2013 and 1% in 2014. What is the present value of investment in this project in 2010? What is the present value of project payments in 2010? Show the calculations.

3. Is it worthwhile to pursue this project?[1] Explain in 30 words or less. Should the interest rate in 2014 be higher or lower than 1% to make government indifferent about pursuing or not pursuing this project if interest rates in 2011-2013 remain as stated? Explain.

4. Government investments often turn out to be highly ineffective compared to private investments. Take any assumption in this model and explain in 5 sentences or less how this can happen.

II. Solve Problem 6 on pp. 38-39 in Macroeconomics textbook by Mankiw, 5th ed.

[1] There is an implicit assumption that government is risk neutral and acts as expected utility maximizer.

III. Suppose that the production function is given by $Y = A\frac{(KL)^{1-\delta}}{1-\delta}$, where A is total factor productivity.

1. What is marginal product of labor for this function?

2. Suppose that $A = K = 1$ and $delta = 3/4$. Define a grid of 200 equally spaced points for labor as $L = \{0, 0 + step, 0 + 2 * step, ..., L_{max}\}$ with $L_{max} = 20$. That is, $L = \{0, 0 + 20/199, 0 + 2 * 20/199, ..., 20\}$. Using any software available (i.e. Excel etc) plot (i) the production function over the entire grid and (ii) marginal product of labor over the entire grid. Attach your graph on a separate piece of paper. Explain how the two graphs exhibit the desirable properties of production function and MPL.

3. Is this function characterized by *Constant Returns to Scale (CRS)* property (assuming that $\delta \neq 0$)? *(Hint: It is NOT sufficient to prove something by example but it is sufficient to prove that something does not hold by using a counter-example.)*

IV. [MACROECONOMIC CASE] Suppose that you are appointed as a chief macroeconomic advisor to Platinum Bank. You are requested to analyze and forecast the UAH/USD exchange rate in Ukraine till December of 2013. Download from the National Bank of Ukraine website (or other source) the monthly time series of the exchange rate in Ukraine for the entire period of the independence. On a separate piece of paper type a half-page executive summary about the exchange rate in Ukraine and attach it to the homework.[2] In addition, on the same page include 1 table or 1 graph. Finally, in 3-4 sentences justify your forecast of the exchange rate.

[2]Executive summary is a short non-technical report prepared for decision makers in government or private sector.