

Student name: \_\_\_\_\_

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**ECON 133 “Global Inequality and Growth”**  
**Final**

**Instruction: Write your answers in the boxes: nothing outside of the boxes will be graded. You can use a pencil but please write clearly.**

**Exercise 1: True False Statement/Questions (12 points)**

Explain your answer fully based on what has been discussed in lecture and in section. No more than **5 lines per question**. All the credit is based on the explanation.

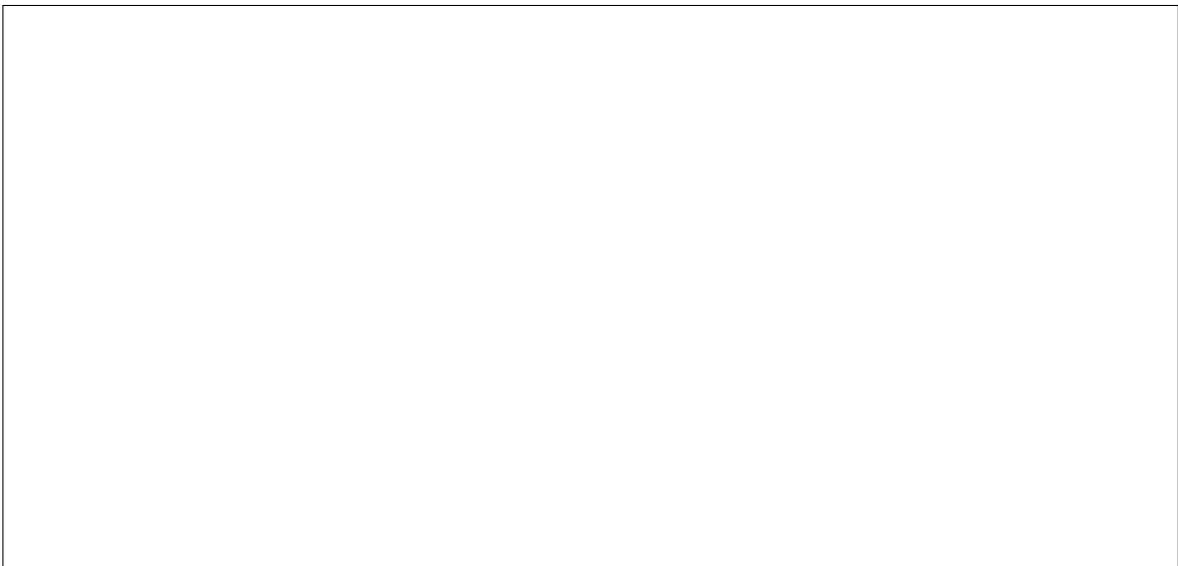
1.  $\text{GDP} = \text{National Income} - \text{depreciation of capital} + \text{net foreign assets}$ . (2 points)

2. In light of the evolution of the capital share, the CES function with an elasticity of substitution of 1 isn't a good approximation for the aggregate U.S. production function. (2 points)

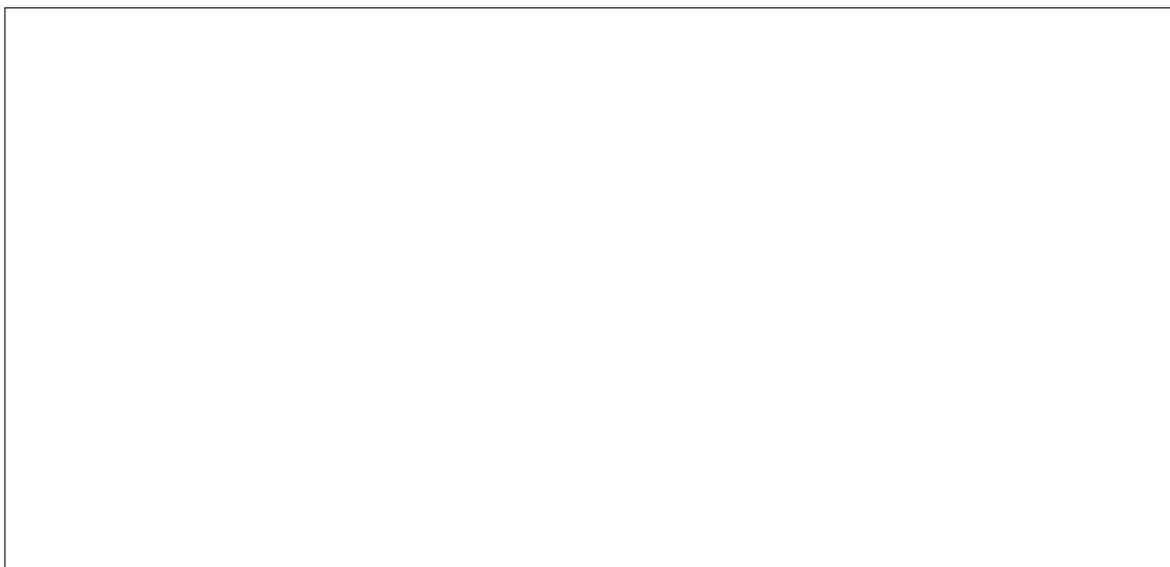
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3. Suppose that we have two homogeneous groups, one below percentile 90 with an income share of 45 percent and one above percentile 90 with an income share of 55 percent. The Gini Coefficient in this economy is 0.35. (2 points)



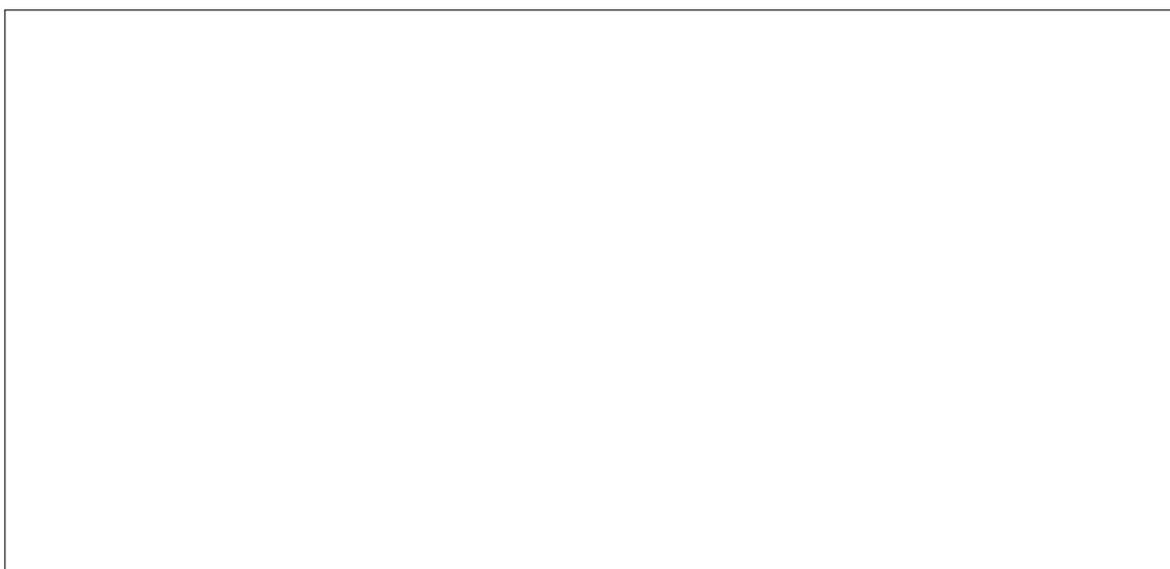
4. Since the 2000s, the main driver of the gender gap has been differences in education level between men and women. (2 points)



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5. Since China has a lower tax revenue/GDP ratio than developed economies, its government has a more limited role than in Western countries. (2 points)



6. In a dynamic random shocks model, a larger gap between  $r$  and  $g$  implies a lower Pareto coefficient for the top of the steady-state distribution of wealth. (2 points)



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**Exercise 2: Wealth Inequality (10 points)**

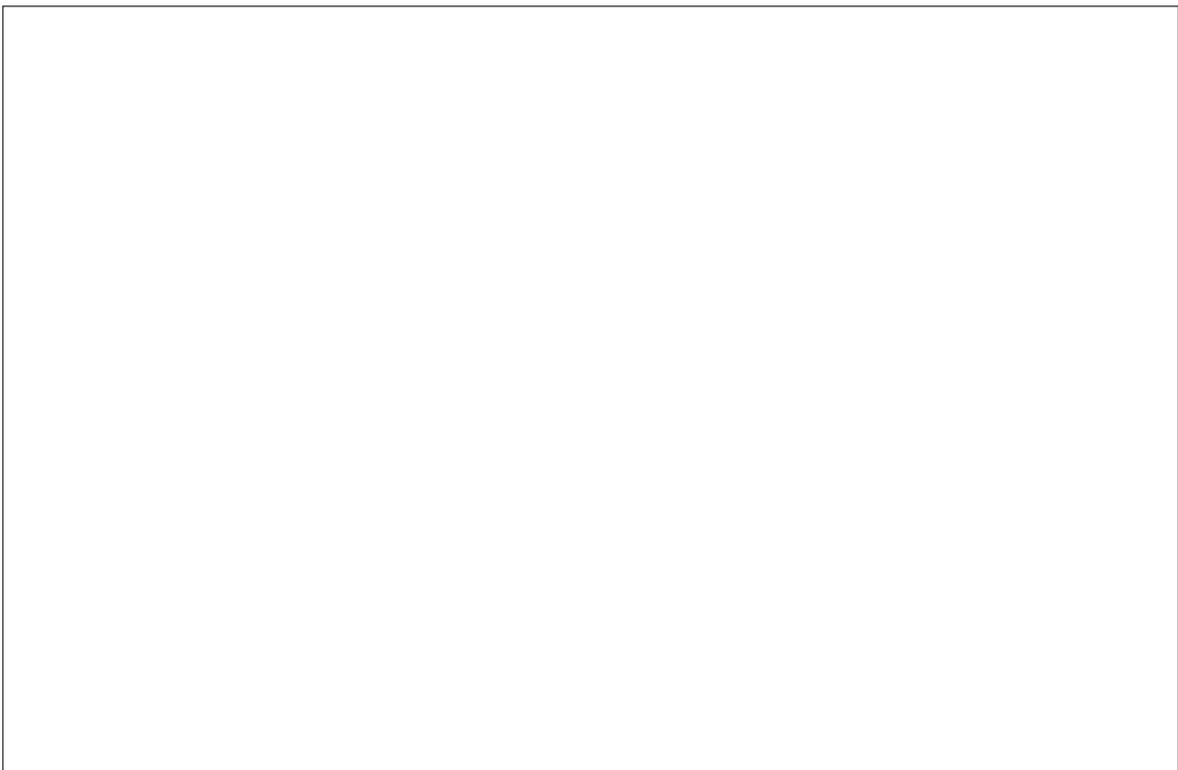
*Part A: Modigliani's life-cycle model*

Assume that everybody starts working at age 0, works for  $N$  years, dies at age  $L$ , and leaves no inheritance. Labor income  $Y$  is constant at  $\bar{Y}$  during working age; it is 0 afterward. Assume that individuals smooth their consumption ( $C$ ) across their life cycle and that there is no growth of the economy and the interest rate is zero.

- a) Express individual annual consumption  $C$  and the savings rate  $S$  (both between 0 and  $N$  and between  $N$  and  $L$ ) as a function of  $\bar{Y}$ ,  $N$  and  $L$ . (2 points)



- b) Use a graph to represent income  $\bar{Y}$ , consumption  $C$ , saving  $S$ , and wealth  $A$  as a function of age. What is the amount of saving an individual will have accumulated at the time when he or she retires? (2 points)



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- c) Can this model explain the inequality (of income or wealth) between two individuals of the same age? Why? (1 point)

- d) Recall the parameter  $\mu_t$  in the formula for the aggregate bequest flow seen in lecture. Define this parameter. What value does it take in Modigliani's life-cycle model? (1 point)

- e) Now assume  $\mu_t > 1$ . Draw a graph of wealth  $A$  as a function of age that is consistent with this assumption. Indicate at least one assumption of the Modigliani model that needs to be relaxed for the wealth accumulation process to take this shape. (1 point)

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*Part B: Inherited Wealth*

Modigliani (1986, 1988) defines inherited wealth as  $W_{Bt}^M = \sum_{t-H \leq s \leq t} B_s$  where  $B_s$  is the observed (past) annual inheritance flows over the last  $H$  years.

- f) What alternative formula do Kotlikoff and Summers (1981, 1988) propose for  $W_{Bt}$ ? What is the main difference with Modigliani's formula? (1 point)

- g) Explain how Piketty, Postel-Vinay and Rosenthal (2013) define  $W_B$ . How does this definition improve over the Modigliani and Kotlikoff and Summers ones? (1 point)

- h) Provide a graph with the approximate values of  $\varphi$  over the last century for either Europe or the U.S. (1 point)

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**Exercise 3: Taxation (10 points)**

*Part A: Optimal Labor Income Taxation*

- a) How have top marginal labor income tax rates changed over the past century in the United States? Explain how top marginal labor income tax rates can affect the concentration of pre-tax income at the top. (1 point)

- b) Write the optimal labor income tax rate formula under a Rawlsian social welfare function. Provide the formula and intuition behind the elasticity term in this optimal labor income tax rate formula. (2 points)

*Part B: Optimal Capital Taxation*

- c) Provide one argument supporting the view that it may not be desirable to tax capital if labor income is already taxed. (1 point)

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- d) Explain why the following statement is incorrect: If the tax-base shifting elasticity is zero, then there is no reason to tax capital. (1 point)

- e) Write the optimal inheritance tax rate formula when the government cares about maximizing the welfare of people born with no inheritance, and explain every term in the formula. (2 points)

*Part C: Comparison*

- f) Why does the optimal tax rate formula differ for labor income vs. bequest taxation? (2 points)

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g) Empirically, how does the top marginal bequest tax rate compare to the top marginal labor income tax rate in the United States today? How can this be rationalized? (1 point)



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**Exercise 4: Tax avoidance and tax evasion (8 points)**

- a) Provide a concrete example of a way in which a firm may shift their profits from a high tax to a low tax country. Be as precise as possible. *(2 points)*

- b) Define formula apportionment and explain how it can help solve the problem of corporate tax evasion. It is not necessary to write down the formula if you do not remember it. *(2 points)*

- c) Explain what an integrated corporate tax is and why it could reduce profit-shifting. *(2 points)*

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d) Assume you are given estimates of the top income share computed using tax returns data. Do these estimates over or underestimate inequality? Explain why. (2 points)

**Bonus (2 points):** We tweeted an NPR article about the wealth tax (“Why A Wealth Tax Didn’t Work In Europe”). Give one reason why European countries abolished their wealth tax. Should the U.S. implement a federal wealth tax, would it face the same problem(s)?

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