ECON 133 "Global Inequality and Growth"
Final Exam

Exercise 1: True False Statement/Questions (20 points)

Explain your answer fully based on the material seen in lecture and section (no more than 5 lines per question). All the credit is based on the explanation. (2 points for each question.)

1. The increase in income inequality since the 1970s has reduced intergenerational mobility in the U.S. That is, children born to low-income families are less likely to become high-income adults today than four decades ago.

   - FALSE. Contrary to popular opinion, U.S. mobility has not decreased (see Chetty et al. 2014, referenced in Autor 2014). Simply put, it has always been relatively low (this might change, though, for cohorts born since 2000). (*+2.0*)

2. Policies have not mattered much in the rise of U.S. inequality—only market forces have.

   - FALSE. Autor argues that even if supply and demand forces are a central cause of rising inequality, policy and governance do play a central role in shaping inequality. Specifically, the minimum wage (*+0.5*), labor unions (*+0.5*), globalization (*+0.5*), and income taxation (*+0.5*) have all affected inequality (see lecture). Indeed, Atkinson (2015) further discusses the different policies established by OECD countries in the 20th century that helped reduce inequality (*+0.5, non-cumulative*).

3. Gordon (2012) argues that the US economy will face six headwinds in the future—baby-boomer retirement, stagnating educational attainment, rising inequality, globalization, global warming, mounting public and private deficits—and that only the first one can potentially be counteracted.

   - TRUE. This headwind could potentially be counteracted by raising the inflow of immigration (*+1.5*), especially for high-skilled immigrants (*+0.5*).

4. Since its introduction in 1933, the US federal minimum wage has kept increasing, leading to high unemployment rates among low-skilled individuals.

   - FALSE. Today, the federal minimum wage is lower than it was in 1960 (*+1.0*). Also, empirical evidence suggests that small increases in the minimum wage have no negative employment effect (*+1.0*). In fact, Card and Krueger (1994) show that an increase in the minimum wage in New Jersey actually raised employment by raising labor supply (*+0.5, non-cumulative*).

5. The US can contribute to reducing global inequality by increasing immigration.

   - TRUE. Milanovic (2012) argues that 2/3rds of global inequality is due to location (*+1.0*). Remittances sent by immigrants to their families in home countries contributes to reduce inequality in home countries (*+0.5*). This will not affect inequality in the US: Card (2009) analyzes the effect of immigration on US wage inequality and finds that it has a very small (if any) effect, partly because immigrants and natives are imperfect substitutes (*+0.5*). Finally, according to Gordon (2012), migration can help increase income growth rate (which will then make wealth-to-income ratios fall because $\beta = s/g$) (*+0.5, non-cumulative*).

6. Global capital mobility has small effects on inequality across countries but can exacerbate inequality within countries.

- TRUE. Developing countries are foreign capital receivers on net. However, most growth success stories financed by domestic investment, and not foreign investment, which explains why capital mobility may have small effects on inequality across countries (*+1.0*). However, within-country inequality can be exacerbated because capital mobility makes it easier for wealthy taxpayers to avoid/evade taxes. Moreover, the high-return investments may mostly benefit the wealthy and fosters financial fragility of recipient countries (*+1.0*).

7. The Panama Papers have revealed how easy it is for wealthy individuals to avoid and evade taxes. This means that governments should cut capital taxes.

    - FALSE. It is true that the Panama Papers revealed the extent to which wealthy individuals avoid and evade taxes through offshore accounts. In fact, 8% of the world's financial wealth is offshore (80% of which represents criminal tax evasion). However, reducing corporate taxes is not a panacea. First, this undermines the individual income tax (*+0.5*). Second, it increases inequality (*+0.5*). Finally, it generates a negative externality on other countries, eroding tax collection (*+0.5*). Instead of turning to this "race to the bottom", governments should make profit shifting more difficult by strengthening arm's length rules (or replacing them with formula apportionment) as well as sanctions for territories and institutions that facilitate criminal activity. Another solution would be to create a world financial registry (*+1.5, non-cumulative*).

8. The linear income tax rate that maximizes income tax revenues also maximizes the Rawlsian social welfare function.

    - TRUE. When using Rawlsian social welfare function, we want to maximize the utility of worse-off individual (*+1.0*). In the model learned in lecture, the worse-off individual receives only non-labor income G from the government, which is what τ^* maximizes (*+1.0*). See Lecture 23.

9. If inequality came entirely from labor income inequality, then capital taxation should be zero.

    - FALSE. Even if inheritance did not play a role, there are still practical reasons to tax capital (*+1.0*). In practice, for instance, it is not easy to decompose income flows into pure L and K components (think Mark Zuckerberg). To avoid income shifting due to differential tax treatment of L and K, capital tax should be positive (*+1.0*). In fact, in the extreme case where the government cannot distinguish at all between L and K, then the marginal tax rates on L and K should be equal.

10. Effective corporate tax rates on US corporate profits have fallen substantially since the 1990s because of artificial profit shifting to low-tax countries.

    - TRUE. The effective corporate tax rates on US corporate profits have dropped since 1980 (*+1.0*). Artificial profit shifting is the main factor behind this trend (*+1.0*).

Exercise 2 (10 points): Pareto coefficient and optimal labor taxation at the top

1. Assume that income is Pareto-distributed at the top, with Pareto-coefficient a. Is inequality high or low when a is low? Is a higher for income distributions or wealth distributions? (2 points)

    - Inequality is high when a is low. There is more inequality for wealth distributions than income distributions, hence a is lower for wealth.

2. In addition to the Pareto coefficient a, give two other ways to quantify income and wealth inequality among individuals (2 points).

    - Gini coefficient, top shares.

3. Assume that labor income is Pareto-distributed with Pareto coefficient a. Express the revenue-maximizing tax rate τ^* on top labor incomes as a function of a and of the elasticity of taxable income with respect to the net-of-tax rate e. Interpret this formula. (2 points)

   - $\tau^* = \frac{1}{1+a \cdot e}$. Don't tax what's elastic; tax more when inequality is higher.

4. A number of recent studies have estimated that e is around 0.2 for top earners. Could the U.S. federal government raise more revenue today by increasing its marginal income tax rate? (1 point)

   - Yes: with $e = 1.5$ and $a = 2$, $\tau^* = 71\%$ which is more than the current top tax rate.

5. Based on empirical and theoretical evidence discussed in class, how do you think an increase in top income tax rates would affect inequality and growth? (3 points)

   - Empirical evidence shows that inequality is lower when top income tax rates are higher and that there is no correlation between changes in top tax rates and economic growth over the last 50 years. In theory, higher top tax rates could reduce growth (if strong labor supply response) have no effect on growth (if strong bargaining effects) or even increase growth (if strong bargaining effects, and extra revenues are used to finance under-provided public goods and services).

Exercise 3 (10 points): $r > g$

1. Explain why wealth inequality tends to be high when the gap between r and g is high. (2 points)

   - Wealth reproduces itself more quickly than new wealth appears; capital owners only have to save a fraction g/r of their income for their wealth to grow as fast as the economy.

2. Historically, how has the gap between r and g evolved? (2 points)

   - See lecture 16

3. What are the main ways in which tax policy can affect r? (2 points)

   - Corporate taxes, property taxes, dividend, interest, capital gains taxes, reduce the gap between the net-of-tax rate of return and g.

4. Do you think that $r > g$ is the main reason why inequality is rising in the United States today? (2 points)

   - Right now key force is snowballing effect of top labor and entrepreneurial incomes: top incomes are being saved at high rates, pushing wealth concentration up; in turn, rising wealth inequality leads to rising capital income concentration, which contributes to further increasing top income and wealth shares. $r > g$ already matters in this process and may become key down the road.

5. What will happen to the gap between the rate of return r and the income growth rate g if g falls and the aggregate saving rate s remains constant? Discuss how the results depend on the elasticity of substitution between capital and labor. (2 points)

   - In that scenario β rises, and r falls. The magnitude of the fall in r depends on σ. If $\sigma = 1$ (constant capital share) then r/g remains constant; if $\sigma > 1$ (rising capital share) then r/g would rise; if $\sigma < 1$ (falling capital share) then r/g would fall.

Exercise 4 (10 points) Models of Wealth Distribution

Denote sh_W^p the share of wealth owned by fractile p (for instance p can be the top 10%), sh_Y^p the share of income earned by fractile p, s^p the saving rate of fractile p and s the economy-wide saving rate.

1. Show that in a long run steady-state without price effects (i.e., without capital gains or losses), $sh_W^p = sh_Y^p \cdot \frac{s^p}{s}$. (3 points)

   - State the HDS formula in the steady state: $\beta = s/g$ (0.5)
   - From $\beta = s/g$, divide both sides by β^p with $\frac{\frac{W}{Y}}{\frac{W^p}{Y^p}}$ for the left side and $\frac{\frac{s}{g}}{\frac{s^p}{g}}$ for the right. (1.5)
   - Rearrange to find $sh_W^p = sh_Y^p \cdot \frac{s^p}{s}$ (1)

2. Interpret this equation. (2 points)

   - This equation relates wealth shares and income shares for different groups in a society. It describes how wealth shapes income distribution, and how income shapes wealth distribution through saving. (1)
   - The larger the relative savings rate of a group p (i.e. top 10%) the wealth share owned by group p will be larger than the income share owned by group p. (1)

3. Consider the saving rate s^p of the top 10% of the income distribution. Under the precautionary saving model, is $\frac{s^p}{s}$ smaller, equal to or larger than 1? (2 points)

   - If p represents the the 90th percentile, then s^p should be smaller than s under the precautionary model. Therefore, $\frac{s^p}{s}$ is smaller than one. (1)
   - Under the precautionary model, people save due to possibility of a loss (i.e. job loss). In that sense, poor people, who rely more on their labor income, will save more for the "rainy days" than rich ones. In the end, s^p will be lower than the average savings rate of the population. (1)

4. Is the precautionary saving model consistent with the data? (1 point)

   - No. (0.33)
   - Rich save more than poor. (0.33)
   - Such unequal savings rate increases wealth concentration. (0.33)

5. What are the economic forces that can explain why the relative saving rates s^p/s of top earners (top 10% and above) is greater than 1? (2 points)

   - Dynamic shocks model can explain it better. (0.5)
   - Dynamic shocks from savings taste, rate of return and number of children are related to a higher savings rate for the top earners. Under this model, the higher the variance of shocks, the lower is the Pareto coefficient a, meaning higher inequality. (1.5)

Exercise 5 (10 points) Inherited vs Self made wealth

Denote φ the proportion of inherited wealth in total wealth.

1. How does Modigliani measure φ? What value for φ does Modigliani find in the US? (2 points)

   - Modigliani (1986, 1988) chooses zero capitalization: $W_{Bt}^M = \sum\limits_{t-30 \leq s \leq t} B_s$ (1)
   - Modigliani (1986, 1988): 80% of US wealth is self-made. (1)

2. How do Kotlikoff and Summers measure φ? What value for φ do Kotlikoff and Summers find in the US? (2 points)

   - Kotlikoff and Summers (1981, 1988) capitalize past inheritance flows using economy's average rate of return to wealth r: $W_{Bt}^{KS} = \sum\limits_{t-30 \leq s \leq t} B_s \cdot (1+r)^{t-s}$ *(1)*

   - Kotlikoff and Summers (1981, 1988): 80% of US wealth inherited. *(1)*

3. What explains the difference between Modigliani's and Kotlikoff-Summers' results? (2 points)

   - Both Modigliani's and KS's definitions are problematic. *(0.5)*

   - They have different methods to account for the capitalization of inherited wealth flow. *(0.5)*

   - For Modigliani, zero capitalization makes no sense: inheritors with zero labor income can appear as life-cycle savers. *(0.5)*

   - For K-S, full capitalization also inadequate: φ_t can be higher than 100%. *(0.5)*

4. Give the correct definition of φ that we saw in class (Piketty, Postel-Vinay and Rosenthal's definition). (3 points)

   - To properly measure aggregate inherited wealth, one has to distinguish two types of agents: savers (assets > capitalized value of inherited wealth) and inheritors (assets < capitalized value of inherited wealth). *(1.5)*

   - Aggregate inherited wealth (W_B) = inheritors' wealth + the inherited fraction of savers' wealth. *(0.5)*

   - Aggregate self-made wealth (W_S) = non-inherited fraction of savers' wealth. *(0.5)*

   - This guarantees that $\varphi_t \leq 100\%$ and $W_{Bt} + W_{St} = W_t$. *(0.5)*

5. In the US today, what is the approximate value of φ? (1 point)

   - Using the PPVR method, Alvaredo, Garbinti and Piketty (2015) estimates that the value of φ in US is between 50% and 60% today. Actually, around 55% for the benchmark estimate and around 65% for the high-gift estimate. *(1)*

   - There was a typo in section notes, so full credit will be given for answer estimating 75% for φ in US.