

ECON 133 “Global Inequality and Growth”
Final 1, May 15

Student name:

Student ID number:

You have 3 hours

Instruction: Write your answers in the boxes: nothing outside of the boxes will be graded. You can use the computer or print the assignment and scan your answers. **If writing in word, don't expand the boxes!**

If using word to answer the questions you can either use the equation editor (click insert -> equation) or simply use computer typography: e.g. you can write $s_t \cdot \frac{Y_t}{W_t}$ as s_t*(Y_t/W_t)

Exercise 1: True or false statement (12 points)

a) *True or false: There is always a trade-off between equity and efficiency (2 points)*

False: Theoretically there is a host of anti-inequality measures that promote equity while improving efficiency. To name a few: breaking up monopolies and monopsonies, stopping nepotism, fighting discrimination, curbing tax evasion, limiting bargaining, improving public schooling and public health care etc.

Taxation (as a mean to achieve equity) disincentivizes work and thereby reduce efficiency, but this has to be held against what the tax revenue is spend on. E.g. public spending on child care incentivizes work.

As an empirical observation countries with low income inequality (measured by GINI) have experienced higher economic growth than countries with high income inequality. The US had higher growth from 1950 to 1980 than from 1980 until today, despite having more redistribution and higher tax rates from 1950-1980. Similarly, societies with low inequality show greater financial stability, longer lifespans, less crime etc.

More points apply and the student will receive full points for sketching out any of these

b) *True or false: Development aid harms the quality of institutions as it incentivizes governments to underperform (2 points)*

False: Jones and Tarp (2015) evaluate the impact of aid on governance over a thirty year timespan. They find that development has marginally increased the quality of institutions and that this is driven by the portion of aid aimed at improving governance

c) *True or false: Countries receiving the most aid have experienced less economic growth than countries receiving little aid. Therefore, development aid is unsuccessful in delivering economic development. (2 points)*

False:

1) *Countries at the bottom of the development ladder are the ones most likely to receive development aid. This has to be taken into account when measuring the link between ODA and GDP.*

2) *Tarp (2013) finds a robust positive relationship between aid and GDP in the last 30 years when taking into account the relationship between low initial growth and aid.*

Mentioning either point will give the student 2 points

d) *True or false: In the long run, wealth inequality is the result of savings and income inequality. (2 points)*

True:

Individual i wealth accumulation can always be written:

$$W_{t+1}^i = (1 + q_t^i) \cdot (W_t^i + s_t^i Y_t^i)$$

where W_t^i wealth, Y_t^i is income, s_t^i is net savings rate,

$1 + q_t^i$ is rate of capital gains (price effect) in year t

In a long-run steady-state without price effect, then:

$$sh_W^P = sh_Y^P \cdot \frac{s^P}{s}$$

i.e. share of wealth = share of income · relative savings rate

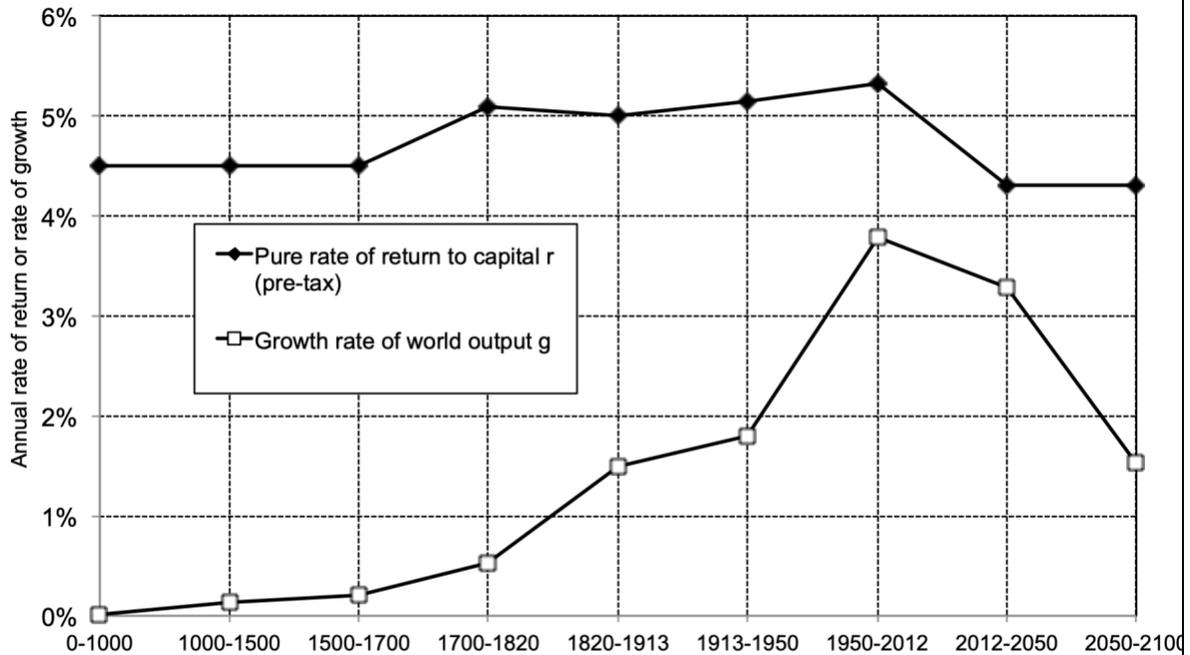
(Students don't need to derive, but can simply respond with intuition)

e) True or false: Without capital taxation, r would have been greater than g for the duration of the recorded human history. That is, the rate of return on capital (r) would have been greater than the economy wide growth rate (g). (2 points)

True: Simply an empirical observation from Piketty (2014)

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Figure 10.9. Rate of return vs. growth rate at the world level, from Antiquity until 2100



The rate of return to capital (pre-tax) has always been higher than the world growth rate, but the gap was reduced during the 20th century, and might widen again in the 21st century.

Sources and series: piketty.pse.ens.fr/capital21c

f) True or false: If the GINI coefficient decreases this implies that the top 1 percent income share is reduced (2 points)

False: If e.g. there is redistribution from the middle class (income percentile 50-90) to the bottom 50 percent income earners this reduces inequality (measured by the GINI coefficient) without affecting the top 1% income share. Students may answer using other examples.

Exercise 2: Wealth accumulation (8 points)

Let s_t define the economy wide savings rate (net of depreciation) at time t ; Y_t define national income and $g_t = \frac{Y_{t+1}}{Y_t} - 1$

a) Write the steady state expression for the wealth-to-income ratio (do not derive) (1 point)

s/g

b) Explain the intuition behind the steady-state level of wealth-to-income (1 point)

The larger the savings rate, the larger the wealth accumulation, which increases the wealth-to-income ratio. As a countervailing force, income growth will over the long run diminish the importance of past savings and decrease the wealth-to-income ratio.

In the long-run, initial endowments and temporary price-effects (capital gains) will not matter.

Students may alternatively show this mathematically

c) Does a rising level of the wealth-to-income ratio ($\beta = W/Y$) imply a larger capital income share ($\alpha = r \cdot \beta$) ? (2 points)

Note necessarily. That depends on how r is impacted by an increase in β . In general a larger β implies a lower r . For the capital income share α to increase the rate of return (r) must fall proportionally less than the increase in β . Intuitively, the increased income generated from wealth accumulation can either disproportionately accrue to workers or investors, we cannot a priori know who benefits the most.

d)

- e) Consider an economy with perfect competition and a CES (constant elasticity of substitution) production function. Let σ define the elasticity of substitution between capital (K) and labor (L). Under what conditions will an increase in K imply a larger capital income share? (2 points)

$$\sigma > 1$$

- f) Consider an economy without perfect competition – how might wealth accumulation impact the capital income share? (HINT: Consider the impact on bargaining power) (2 points)

If wealth accumulation is concentrated to a few extremely wealthy individuals this could come at a risk of creating a small wealthy elite with large political sway to impact tax, industrial and labor law. Similarly, consolidated wealth can be used to create monopoly/monopsony power. In all these instances, wealth accumulation can increase the bargaining power of capital owners and allow them to extract larger economic rents (increase the capital income share)

BONUS We tweeted an article from Branko Milanovic on the nature of wealth <https://glineq.blogspot.com/2020/02/what-is-wealth.html>. What are the issues he highlights in comparing wealth over time? (2 points)

To cite his conclusion: “comparing wealth over different ages is not only fraught with difficulties or rather impossible because we cannot assign values to the things that did not exist in the past and exist now, but because we have trouble comparing wealth in different societies with structurally different features. We have to realize that it is okay to compare wealth of the people on the Forbes list so long as they share similar social environment: the same ability to protect that wealth, to use it to boss people around, to bequeath it. The moment when these underlying conditions diverge comparison ceases to be meaningful.”

Exercise 3: Capital taxation (10 points)

a) Why would the government like to tax capital? Why not just tax wages? (2 points)

If inequality entirely came from labor income, it would be useless to tax K. But in practice inheritance plays a big role. And it is not easy to separate L from K income flows → These are the two key reasons why capital should be taxed

Main situations where the K/L frontier is fuzzy:

- *Business owners can decide how much they get paid in wages vs. dividends*
- *Freelancers (journalists, consultants...) and self-employed (doctors, lawyers, etc.) can incorporate*

b) What are the issues with source-based corporate taxation?(2 points)

Three main consequences of source-based taxation:

- *Profit shifting to low-tax countries*
- *Relocation of capital to low-tax countries*
- *Tax competition leading to equilibrium where tax rates are too low*

(2 points for mentioning 2/3, 1 point for mentioning 1/3)

c) Describe transfer pricing and the arm's-length principle. (1 point)

Transfer pricing is the price affiliates put on all internal transactions. That is, if two affiliates of the same firm transact goods or services they need to price this according to governing tax rules and this price is called the "transfer price"

The arm's-length principle implies that the internal transfer price between the two affiliates cannot differ from a price two unaffiliated firms would have transacted at.

d) *What issues occur when firms are asked to follow the arm's length principle? (1 point)*

The arm's-length principle is in many cases meaningless. When affiliates of the same firm transact they often transact in services that no unaffiliated firms would ever do. E.g. what is appropriate arm's-length price on using know-how from the head office or the brand of IKEA?

In this ocean of meaninglessness firms have plenty of options to skew the price in their favor and shift income to tax havens. In short, ALP is a bureaucratic nightmare which firms can exploit to minimize their tax bill.

e) *Give a concrete example of how a firm might shift income to tax havens? (2 points)*

One important channel of profit shifting is transfer mispricing. That is, firms can reduce their tax bill by applying a high price on items/services flowing from affiliates in low-tax countries to affiliates in high-tax countries, and vice versa. This erodes the profits in the high-tax affiliate, which is paying the high price, but equally increases the profits in the low-tax affiliate, which is receiving the high price.

Relatedly, firms can give internal loans with high internal interest rates and redirect consumers to buy directly from tax haven affiliates.

f) *How could the global corporate tax regime be improved? (2 points)*

Several potential solutions (all will give full points). Let's start with the easiest: corporate tax harmonization. If countries could agree on a global minimum corporate tax rate of say 25%, the problem of profit shifting would largely disappear, as tax havens would simply cease to exist.

This was already suggested by the EU Commission's Ruding Committee in 1992, which proposed a minimum EU corporate tax rate of 30%. Skeptical readers might have a hard time seeing tax havens such as Malta, Hong Kong or Luxembourg agree to this and kill a major revenue source. And the failure of any global agreement suggests that these readers are right.

There is, however, a solution to that also. Say Google reports \$22bn dollars of profits in Bermuda to be taxed at 0%. The US tax authority can in this case choose to cash in the residual tax payment of 25% by itself. A version of this model was implemented with the Trump tax reform - the only problem being that the minimum tax rate imposed was only 13% (with loopholes built in) and hence still left firms with an incentive to shift profits.

Alternatively: Instead of treating the multinational firm as a collection of national entities we need to treat them as one firm. Concretely, if, for example, Google reported \$30bn in consolidated global earnings, and 10% of its revenue comes from France, then France should get to tax 10% of Google's global earnings (\$3Bn). In order for the company to shift their earnings to Bermuda, they have to ask their customers to move.

Exercise 4: Monopsony (10 points)

Consider a small firm with one production input (labor). The table below shows the production function of the firm. The Marginal Revenue Product is the value of the extra (marginal) production by hiring one additional employee.

Number of workers	Marginal Revenue Product
1	30
2	20
3	18
4	10

- a) Assume that the firm faces perfect competition and a market wage of 15 – how many employees will the firm hire? (2 points)

The firm will hire workers as long as the Marginal Revenue Product > Marginal Labor Cost. The marginal labor cost equals the market wage of 15, as the wage is fixed and does not depend on how many workers the firm hire. I.e. the firm will hire 3 workers

Now instead assume that the firm has local monopsony power (is the single employer in town) and therefore can determine the governing wage by limiting the number of people it hires (the firm cannot discriminate and has to pay the same wage to all employees). The wage curve facing the firm is given in column 3 “Wage” below

Number of workers	Marginal Revenue Product	Wage	Total Labor Cost	Marginal Labor Cost
1	30	7	7	7
2	20	8	16	9
3	18	15	45	29
4	10	20	80	51

b) *How many employees will the local monopsony hire? (HINT: fill out the remaining two columns) (2 points)*

See the filled-out cols. above in red. The firm will now realize that hiring more workers pushes up the wage received by all workers. Therefore, the marginal labor cost of hiring one additional worker is much higher than the wage received by that additional worker. The firm will hire 2 employees as this is the final point where the Marginal Labor Cost < Marginal Revenue Product.

c) *What level of hiring would be efficient from an economy wide view? (2 points)*

The efficient level of employment is 3 workers. At this point all workers produce revenue which is above the wage they require (i.e. this maximizes total welfare = Total Labor Cost + Total Profits). Hiring less workers than 3 is suboptimal, as the firm could hire one additional worker at 15 dollars, while still making a profit. Similarly, hiring 4 workers is suboptimal, as the last worker will require a higher wage than what the individual can produce in revenue.

d) *How will introducing a minimum wage impact economy wide efficiency? (2 points)*

Introducing a minimum wage of 15-17.999 dollars will increase efficiency, as the monopsony will in this case hire 3 workers instead of 2. Introducing a minimum wage above 18.001-19.999 dollars, will have no impact on efficiency (firm still hires 2 workers as in the unregulated case). Introducing a minimum wage above 20 dollars will lower efficiency, as the firm end up hiring less than 2 workers.

e) *How can governments try to limit monopsony power? (2 points)*

Many potential ways: Begin by removing legislation that supports the monopsonies (licenses, administrative entry costs etc). More crudely, governments can break up monopsonies. Alternatively, Regulate their power through employment legislation/protection. Finally, monopsonies can be kept in check by supporting the seller's bargaining position through unions etc.

More fundamentally, competition can be supported by giving small businesses access to credit, fighting wealth inequality, ensuring that special interests don't affect legislation etc.