Seminar 4

ECON4921- Institutions and Economic Systems

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Consider a version of the"trust game": There are two players A and B. A starts with an endowment 10. At stage 1, she transfers any amount x between 0 and 10 to B and keeps the rest for herself. This is then doubled, so B receives $2x$. At stage 2, player B decides an amount y to return to player A, chosen between 0 and $2x$. This transfer is again doubled, so A receives $2y$. B keeps whatever was not transferred and also receives a final payment of 10.

Assignment I-1

1. Set up the game tree and show A's and B's payoffs as functions of x and y. Use backwards induction to find the subgame perfect Nash equilibrium (SPNE) of the game, and explain why this outcome is not Pareto optimal.

Assignment I-1

Backward induction:

Stage 3 Payoffs are realized:

$$A = 10 - x + 2y$$

$$B = 2x - y + 10$$

Stage 2 B decides on y:

$$\max_y \ 2x - y + 10 \ \text{ s.t. } \ y \in (0, 2x)$$

the y that maximizes B's payoff is $y = 0$

Stage 1 A decides on y taking B's decision as given:

$$\max_x \ 10 - x \ \text{ s.t. } \ x \in (0, 10)$$

the x that maximizes A's payoff is $x = 0$

Assignment I-1

The subgame perfect Nash equilibrium (SPNE):

- A plays $x = 0$ and she receives a total payoff of 10 in stage 3.
- B plays $y = 0$ and she receives a total payoff of 10 in stage 3.

The sum of payoffs in the SPNE is 20.

Is this Pareto optimal?
Definition:*An allocation is Pareto optimal if there is no other feasible allocations such that one player could be better off without making any other player worth off.*

Assignment I-1

Is there a better allocation?

Consider the payoff when the players play the following strategy $x = 10$, $y = 2x = 20$:

- A's total payoff: $(10 - x) + 2y = (10 - 10) + 2(2 * 10) = 40$
- B's total payoff: $(2x) - y + 10 = (2 * 10) - (2 * 10) + 10 = 10$

This allocation Pareto dominates the SPNE presented above.

In fact this allocation is the social optimum in the game.

Assignment I-2

2. Explain why this game can illustrate situations encountered in real life, for instance in market transactions.

Assignment I-2

Discuss!

Assignment I-3

3. Assume now that the players A and B meet regularly, say once every day, to play the trust game. They each have a (daily) discount factor β. Could they then be able to sustain trust in the game? One definition of "trust" is that A chooses $x = 10$ and B chooses $y = 10$.

Assignment I-3

Consider the payoffs under the definition of trust given in the assignment:

$$A = 10 - x + 2y = 10 - 10 + 2 * 10 = 20$$

$$B = 2x - y + 10 = 2 * 10 - 10 + 10 = 20$$

If the game goes on for infinity the discounted payoffs are:

$$A = \frac{1}{1-\beta}\, 20$$

$$B = \frac{1}{1-\beta}\, 20$$

Assignment I-3

Remember the trick is to get B to cooperate. Could A play a trigger strategy?

Trigger strategy: if B deviates A plays $x = 0$. B receives 30 in the deviation period and 10 forever after

Condition for the trigger strategy to work is that B receives more when not deviating:

$$\frac{1}{1-\beta}20 > 30 + \beta\frac{1}{1-\beta}10$$

$$\beta > \frac{1}{2}$$

$\Rightarrow$ A playing a trigger strategy can allow the players to sustain trust as long as they (B) sufficiently value the future.

Assignment I-3

Follow up question: Could the social optimum be reached?

In the social optimum $B = 10$. Plugging this in the condition above gives

$$\frac{1}{1-\beta}10 \geq 30 + \beta\frac{1}{1-\beta}10$$

$$\beta > 1$$

Answer is no.

Could consider weakening conditions to an inequality then it is not impossible but extremely unlikely.

Assignment I-4

4. Assume instead that there are many players around where every player is matched with a randomly chosen other player every period. Discuss to what extent trust can be sustained in this environment. Discuss particularly whether a multilateral punishment strategy, as discussed by Greif (1993), can work in this setting.

Assignment I-4

- No (certain) repeated interaction $\rightarrow$ back in one shot situation
- In the one shot bilateral interaction there is no option to sustain trust (given that the probability of repeated interaction is not extremely high - i.e., sufficiently many players)
- What about a multilateral punishment strategy (MPS):
  - Main mechanism in Greif (1993): each merchant prefers an honest agent because a cheating agents wage is higher due to a lower probability of being employed (self-enforcing)
  - Here: if As can collectively punish Bs the same argument as in the repeated interaction case applies

Assignment I-5

5. Assume players have a visible marker of identity, such as ethnicity. Could a situation where players trust the other player if they are both from the same ethnicity, but not if the other player is from a different ethnicity be a SPNE in the repeated game? Discuss whether this can help us understand why more ethnically fragmented countries on average have less good economic performance than more homogeneous countries.

Assignment I-5

Discuss!

Assignment I-6

6. The Nordic countries have traditionally been among the countries with the highest trust level in the world. Explain first why this may have been a (partial) explanation for the success of the Nordic countries. Discuss next whether this is likely to be a pure blessing in a more globalized world.

Assignment I-6

Discuss!

Assignment II

Consider Engerman and Sokoloff's (1997) paper:

Assignment II-1

1. Try to describe generally how differences in resource endowments affect distribution hence institutional development

Assignment II-1

- Background - the literature claims (1997):
  - Factor endowments do not explain why South America is poorer than North America
  - Institutions are the common explanation
- Hypothesis: *there is a link* from factor endowments, broadly defined, to institutional *and* economic development
- Aspects of factor endowment matter:
  - Conditions that favored growing of cash crops and large scale plantations with slave labor (endowment of slaves played a role also)
    $\rightarrow$ This lead to concentrated land and resource ownership and hierarchical, unequal economic distribution
  - Climate favored mixed farming of grains and livestock and limited gains from large scale farming
    $\rightarrow$ This lead to small scale family farms in North America with more equal distribution

Assignment II-1

- The distributions where mirrored in the equality of institutions to lock in the economic power/existing structure
- Back to modern inequality and growth:
  - Demand argument, free whites spend more on manufactures
  - brought and deep market structures, financial intermediation, investment in infrastructure etc..
  - creative destruction

Assignment II-2

2. In the paper "Inequality does cause underdevelopment: Insights from a new instrument" (2007), Bill Easterly use the abundance of land suitable for growing wheat relative to the abundance of land suitable for growing sugar cane as an instrument for inequality across countries

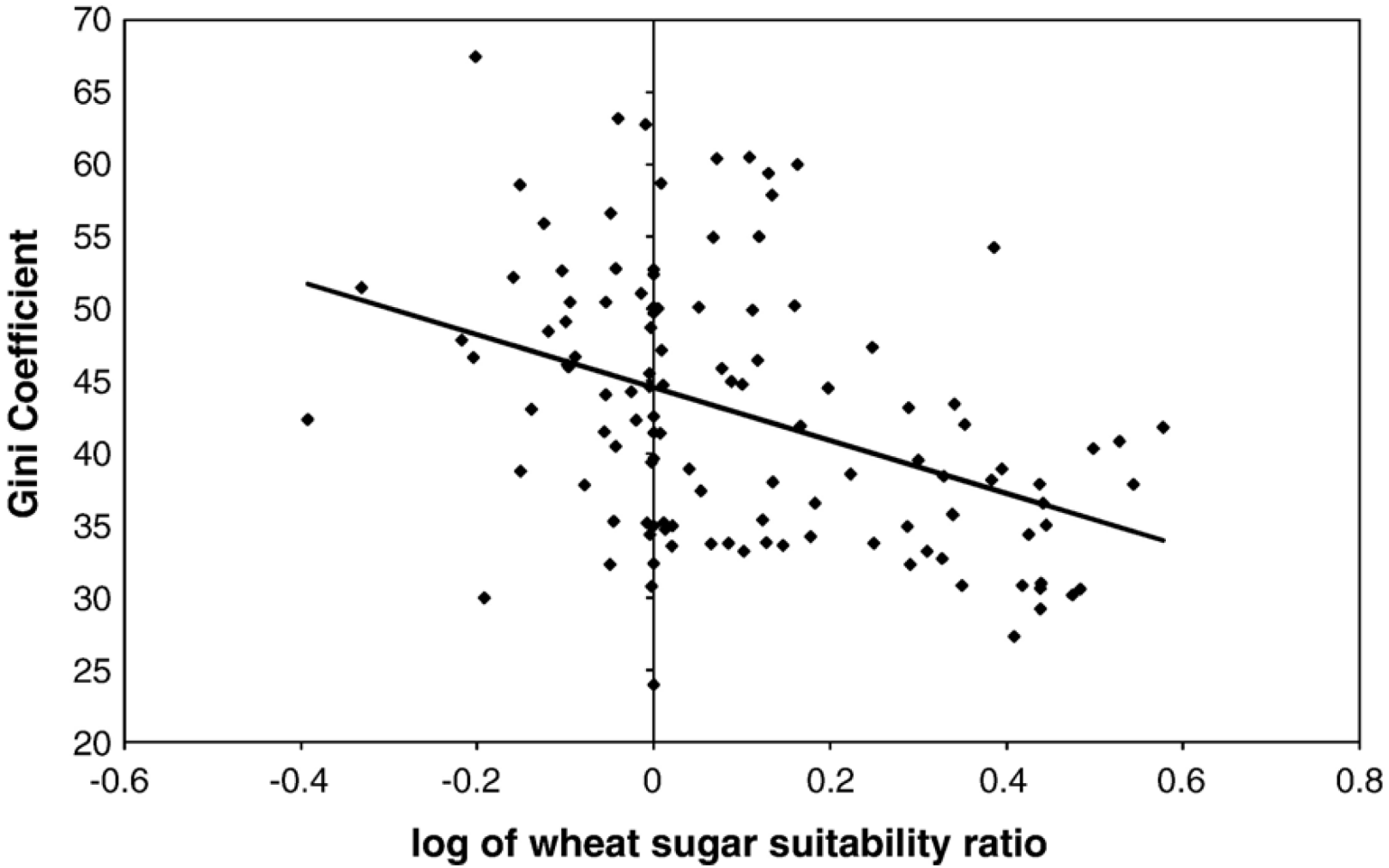
Assignment II-2a

Explain the rationale for such an instrument in light of Engerman and Sokoloff's work.

- See the discussion for II-1 above:
  suitability $\rightarrow$ inequality $\rightarrow$ institutions $\rightarrow$ inequality

Assignment II-2b

The figure shows a version of his first stage regression: Does it correspond to what you would expect?



Assignment II-2c

In the first panel of his Table 4, he attempt to study the causal effect of inequality on development (measured by log per capita income). Discuss his findings.

Assignment II-2c

Table 4
Basic results for development outcomes and inequality: Ordinary least squares and instrumental variables

Regression	Dependent variable: log per capita income, 2002 (lgdppc)							
	Inequality measure: Gini coefficient, 1960–98				Inequality measure: share of top quintile, 1960–98			
	OLS	IV	IV excluding Americas	IV	OLS	IV	IV excluding Americas	IV
Inequality measure	−0.040	−0.121	−0.15	−0.126	−0.043	−0.127	−0.157	−0.143
	(4.27)**	(4.45)**	(3.60)**	(2.43)*	(4.56)**	(4.30)**	(3.53)**	(2.37)*
East and South Asia and Pacific				12.54				14.068
				(6.28)**				(5.24)**
Americas				13.926				15.428
				(5.83)**				(4.98)**
Europe and Central Asia				13.349				14.677
				(7.03)**				(5.86)**
Middle East and Africa				13.053				14.499
				(5.44)**				(4.74)**
Observations	107	97	74	97	106	96	73	96
R-squared	0.13				0.14			
F-statistics from first stage		21.2	15.4	8.8		25.6	18.9	9.1

Assignment II-3

3. In 19th century Norway, the coast of the northern part of the country was politically and economically dominated by an elite of fish buyers (væreier) facing a number of poor fishermen. Further south along the coast, fisheries were less abundant and buyers were less powerful.

Assignment II-3a

What would be the expected outcomes regarding institutional end political development in the two regions according to Engerman and Sokoloff's theory?

Assignment II-3b

It turns out that the first parliamentary representatives from the Labor party (then a revolutionary socialist party) came from the North. How does this fit in Engerman and Sokoloff's framework? How about the model of Acemoglu and Robinson (2001)?