

FINAL EXAM (December 7, 2016)

This is a closed book examination. Please **always explain** how you obtained your answers. No credit will be given for numerical or other answers with no explanation. There are **120 POINTS** in total. You have **TWO HOURS**.

**I. TRUE/FALSE (30 pts) – no points will be given for correct answers without explanation (5 pts each)**

1. The data show that GDP growth and income inequality are always positively correlated.
2. If insurance markets are perfect, a fixed rent agricultural contract should be used instead of sharecropping to achieve efficiency.
3. In developing countries poorer borrowers are often denied loans which suggests discrimination against the poor by the lenders.
4. Requiring collateral can help with enforcement problems in the credit market.
5. Mutual insurance through reciprocal transfers can be used to smooth out both individual and aggregate shocks to the incomes of people in a village.
6. Inclusive institutions cause higher GDP per capita.

**II. Concepts (15 pts) (5 pts each)**

**Give an example or explain in your own words the following concepts. You DO NOT need to provide a formal definition.**

1. purchasing power parity
2. moral hazard
3. social capital

**III. Quantitative Problem (45 pts) Multiple equilibria**

A developing country has two sectors, 1 and 2. In each sector output can be produced using either a traditional, low-productivity technology,  $T$  or using a modern, high-productivity technology,  $M$ . There are  $L$  units of labor in each sector. The  $T$  technology produces one unit of output per unit of labor. That is, output is  $Y_i^T = L$  for  $i = 1$  or  $2$  when  $T$  is used. The  $M$  technology produces  $A$  units of output per unit of labor, where  $A > 1$ . However, to adopt modern production, a *one-time* fixed cost of  $c > 0$  must be paid (e.g., building a factory). That is, output is  $Y_i^M = AL$  when  $M$  is used, but only if the cost  $c$  is paid. There are zero costs of running the  $T$  technology. The demand for the product of each sector equals  $\frac{Y_1 + Y_2}{2}$  units, where  $Y_i$  denotes the output produced by sector  $i = 1, 2$ . The price per unit of either sector's output is  $p$ . Profits in each sector,  $\pi_i$  equal revenue ( $p$  times the demand) minus costs.

- (a) Suppose that both sectors use the  $T$  technology. Show that each sector earns profits  $\pi_i^T = pL$ .
- (b) Suppose now that both sectors adopt the  $M$  technology. Show that profit in each sector is  $\pi_i^M = pAL - c$ .
- (c) Suppose both sectors currently use the traditional technology but *one* of the sectors considers adopting the modern technology. What will be the demand for each sector's output if a *single* sector adopts  $M$ ? Prove that if  $p(A - 1)L < 2c$ , then a single sector *has no incentive* to adopt technology  $M$  (that is, it would earn lower profits compared to sticking with  $T$ ) when the other sector uses technology  $T$ .

(d) Now suppose that both sectors already use the modern technology. Does a single sector have an incentive to switch to using  $T$ ? Why? Justify your answer by comparing the expressions for the sector's profits with and without switching to  $T$ . *Note that the fixed cost  $c$  was already paid when  $M$  was adopted so do not include it in the profit calculation here.*

(e) Use your results from parts (c) and (d) to argue that, if  $p(A - 1)L < 2c$ , this economy has *two equilibria*: a low-output equilibrium in which both sectors use the low-productivity technology  $T$  and a high-output equilibrium in which both sectors use the modern technology  $M$ . Discuss briefly the relevance of these results as a possible explanation for the observed differences in GDP per capita across countries.

#### **IV. Long answer – please answer in NO MORE THAN ONE page (30 pts)**

In class we talked about *microfinance* as an economic policy aiming to reduce poverty and promote development. Briefly discuss and give your interpretation of the basic theoretical ideas behind microfinance; its main advantages and disadvantages, and the evidence on its performance. Mention any potential problems and discuss whether, according to you, there is a need to reform the way microfinance is implemented. Support your answers as well as you can by using theory or empirical evidence from the lectures, discussion papers, or class presentations.