Write your identification number on each paper and cover sheet (the number stated in the upper right hand corner on your exam cover).

Use one cover sheet per question. Explain notions/concepts and symbols. If you think that a question is vaguely formulated, specify the conditions used for solving it. Only legible exams will be marked.

The exam consists of 4 questions. The first two questions are worth 20 points each. Question 3 is worth 35 points, and question 4 is worth 25 points, for 100 points in total. For the grade E 45 points are required, for D 50 points, C 60 points, B 75 points and A 85 points.

Your results will be made available on your “My Studies” account (www.mitt.su.se) 15 working days after the exam, at the latest.

Good luck!
Short essay

About a page (max 2) should be used to answer each question. Worth 20 points each.

1. Jack (2013) reviews research on seven market inefficiencies that constrain agricultural technology adoption. Briefly discuss three of these market inefficiencies.

2. Discuss the research design, including the identifying assumption, and the key empirical findings in Acemoglu and Johnson’s (2007) study on the effect of life expectancy on economic growth.
Problems

Question 3 is worth 35 points. Question 4 is worth 25 points.

3. Consider a model with a credit constrained farmer (borrower) and money lender. To farm, the farmer needs to buy seeds at a cost $S$. The farmer, however, has no cash and therefore needs to borrow $S$ from a money lender. If planting seeds, crop output $Y$ is binary:

$$Y = \begin{cases} 
1 & \text{good harvest} \\
0 & \text{crop failure}
\end{cases}$$

with the probability of a good outcome, $p$, being a function of effort. That is

$$p(e) = e$$

where $e$ is effort exerted by the farmer. The cost of exerting effort is

$$c(e) = \frac{1}{2}e^2$$

where $c > 1$ is a constant.

Assume the farmer has some collateral $w$ and the interest rate charged by the money lender is $i$, implying that the farmer, if taking a loan, must pay the money lender $R = (1 + i)S$ if $Y = 1$ and $w$ if $Y = 0$.

The cost of raising funds $S$ for the money lender is normalized to 0. The money lender’s expected profit of lending money to the farmer is therefore

$$\pi = eR + (1 - e)w$$

(a) Solve for the farmer’s optimal choice of effort for a given $R$ and $w$. Interpret your findings.

(b) Solve the money lender’s problem; i.e., for the optimal $R$ (assuming the money lender takes the farmer’s behavior into account when setting $R$), and the equilibrium choice of effort and welfare/profit of the farmer and the money lender. Interpret your findings.
4. Consider a Solow model with output (income) $Y$ given by $Y = K^\alpha (AH)^{1-\alpha}$, where $K$ is capital, $A$ represents labor-augmenting technology that grows at some exogenous rate, $H = e^{\psi \mu}L$, where $L$ is the labor force, $H$ is the stock of skilled labor, $\mu$ is the fraction of time workers spend learning skills (years in school) and $\psi$ is a parameter capturing the returns to education.

Suppose there are two countries, country A and country B. Country A has a GDP/capita that is 16 times that of country B. Suppose further that education in country A generates a mincerian return of 10% while education in country B generates a return of 20%. Moreover, in country A citizens on average have 10 years of schooling while in country B citizens on average have 5 years of schooling. Suppose that labor’s share of income in both countries is 2/3. Finally, suppose that the capital-income share is 0.64 in country A and 0.16 in country B. Determine the relative importance of capital/GDP, human capital, and TFP in accounting for the difference in GDP per capita across the two countries. Explain and interpret your solution and findings.