

ECO 120

Final Exam

December 6, 2011

Professor Jon Robinson

This exam is scheduled to last 3 hours. There are 125 points on the exam. The points correspond to the number of minutes that each question is designed to take (including checking your answers), so the exam is designed to give you plenty of time to check your answers. If you have trouble answering a question, move on to the next one and come back to the question later on.

Do not open the exam until you are instructed to do so.

If you like, you may take up to an additional 5 minutes to finish the exam. For each minute past the end of the exam, however, 3 points will be deducted from your score. Calculators are allowed.

If you would like to have your exam score posted online after it is graded, put a secret code on your blue book (for instance, "Ernie McCracken"). You do not have to put a code if you don't want to. If you do put a code, make sure to pick something that nobody else would choose. Do not use your ID number.

Before starting the exam, there have been a disturbing number of cheating incidents in this class over the years (including one particularly brazen incident in which a student put his notes in the men's bathroom during the exam). Unfortunately, UCSC has no honor code. As such, I ask all students to write the following honor code on the inside cover or first page of the exam booklet: *"I pledge my honor that, during this examination, I have neither given nor received assistance."* Please sign your name under your pledge.

Good luck!

1. (30 points) For each question, please say whether you think the statement is true, false, or uncertain, and explain your answer. Note that many of these questions do not have a "right" answer - the point is to justify what you write based on evidence from the readings. Be as specific as you can, based on evidence we discussed in this class.
 - (a) Microfinance is a failure.
 - (b) ROSCAs work because they allow people to purchase a big item faster than if they were saving on their own.
 - (c) People in Africa don't use fertilizer because they don't know how it works.

2. (20 points)
 - (a) Describe in words how one would test the Permanent Income Hypothesis. What does the evidence we read suggest about whether the PIH holds?
 - (b) Describe in words how one would test whether village insurance is complete. What does the evidence we read suggest about whether insurance is complete?

3. (30 points) This question asks for more detail on some of the papers you read.
 - (a) We read a paper by Chris Udry on informal credit in Northern Nigeria. He argues that farmers in Nigeria use informal credit as a risk-coping mechanism.
 - i. How are loan terms set by villagers?
 - ii. Udry looks at interest rates in his dataset. How does he construct these?
 - iii. What is the evidence that leads him to believe that credit is used as insurance?
Be specific.
 - (b) We read a paper by Pascaline Dupas and myself called "Why don't the poor save more? Evidence from health savings experiments." This question asks for some more detail on that paper
 - i. There were 4 experimental treatments in this paper. Describe them.

- ii. One outcome of this paper was investment in health technology. Several of the technologies earmarked savings towards this type of investment. What is earmarking? What effect did earmarking have? Explain.
 - iii. One result from this study was that a simple box and lock caused an increase in savings. But since there was no real commitment to keep people from spending the money in the box, why did the box work?
 - iv. What evidence is there on spillovers in the adoption of these savings technologies?
 - v. What effect did introducing these technologies have on longer-term ROSCA outcomes?
4. (45 points) This question is about credit markets in developing countries. Assume that there are 2 types of potential borrowers: high-risk and low-risk. High-risk types have an investment opportunity which pays out H with probability q and 0 with probability $1 - q$. Low-risk types have an investment opportunity which pays off L with probability p and 0 with probability $1 - p$. Both investments cost K to finance. If an individual borrows this money from the bank, the bank charges an interest rate of i , so that the total amount to be paid back is $K(1 + i)$. However, there is limited liability: if the investment fails, the borrower pays back nothing to the bank. The bank could also lend its money at the risk-free rate r (for instance, in secured government bonds). Throughout this question, we will assume that the lending market is characterized by perfect competition among banks. Also assume that both borrowers and lenders are risk neutral (i.e. that $u(c) = c$). The borrower's outside option is to stay at home and earn nothing.
- (a) Write out diagrams to summarize each borrower's expected utility, and the bank's expected profits from lending.
 - (b) What is the maximum interest rate that a low-risk type would pay? A high-risk type?
 - (c) If the bank could differentiate types, what would be the equilibrium interest rate(s)? Interpret this result.
 - (d) Assume that the probability that a borrower is low-risk is s . If the bank cannot differentiate types and lends to both types, what is the equilibrium interest rate?

Interpret this result.

- (e) Assume that $r = 0.1$, $s = 0.1$, $p = 1$, $q = 0.25$, $L = 6$, $H = 8$, and $K = 5$. Use your answer to (b) to find the maximum interest rate each type would pay, and your answer to (d) to find the interest rate if both types borrow. What is the equilibrium interest rate? Who borrows? Interpret your results.
- (f) Assume now that all the parameters are the same but that $q = 0.5$. Redo (e) in this case.
- (g) Now assume that the bank is able to get some collateral C from borrowers. If the investment does not work out, the bank can seize the collateral. For any interest rate, what is the maximum collateral that a high risk type would agree to pledge? A low risk type? Note that it's easier to do this using symbols rather than the specific numbers mentioned in the previous part.
- (h) Which risk type cares most about the interest rate? Which type cares more about the collateral requirements? Given this, explain how the bank could use your answers to (f) and (g) to potentially offer a loan contract which only the low-risk types would be willing to take?
- (i) If the bank lends only to low-risk types but makes zero profits, what must be the relationship between C and i ?