

Development ECON 2273 Problem Set 6

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1. **Some simple BMI calculations.** Calculate the BMI, and (approximately) the relative mortality risk based on comparing the iso-mortality risk curves from Fogel figure 4 for each of the following people. Keep in mind that the curves are actually being calculated based on data for older males and so the results are not particularly reliable. If the person is off the charts, try to figure an approximate mortality.
 - (a) Kate Moss kicked off the “heroin chic” trend with a Calvin Klein campaign in 1993. She was 5’7” and approximately 100 lbs (170 cm and 45.4 kg) give or take a piece of celery.
 - (b) Mike Huckabee, the former governor of Arkansas, famously discovered he had type 2 diabetes and started a weight loss campaign, eventually running a marathon. He says he has continued to struggle with his weight. At his heaviest he weighed approximately 300 lbs (135 kg) and is 5’11” (180 cm) tall.
 - (c) The average Indian man is about 165 cm (5’5”). What weight should the average Indian be to have the smallest mortality risk?

2. **Enforcement of ROSCAs** Rotating Savings and Credit Associations are a common way for the poor to save and get big lump sums. But ROSCAs have many of the same problems that plague credit in general. Suppose 10 women come together, each of them put in \$20 a month, and they pick the first person to get the \$200. All of them can invest in a goat whose milk they will sell. The goat provides an income of \$30 a month. Income from other sources is \$60 a month. They consume all income that they are not saving, or putting into the ROSCA.
 - (a) Suppose all of the women in the group must save separately. They each save \$20 a month for 10 months, and then each buys a goat which adds to her income (buying the goat does not count as consumption), and then they consume all of income from then on. What is the average consumption of the group over the 10 months that they are saving, and after each owns a goat?
 - (b) Now suppose that they form a ROSCA and give the \$200 the first month to one member, and so on until they have all received \$200 and each bought a goat. Calculate average consumption of the group for each month. Remember that the person who gets the money first must keep on contributing afterwards, but has a higher income. Did the ROSCA help the group on average?

- (c) The last member of the group only gets the \$200 after 10 periods. Once she learns that she is last, does she prefer saving or being in the group, or is she indifferent? Before they hold the lottery and find out who goes first and last, are any of the women indifferent about joining?
- (d) Now consider the incentives of the first person to get the payout. She has to show up for the next nine months and pay \$20, otherwise the scheme falls apart. Suppose the only threat the group has is that they will kick her out if she does not pay into the group, and she will not be eligible for the next round of the ROSCA. If she is kicked out of the group, she can still save \$20 dollars for the next 10 months. Given her outside option, is being kicked out bad for her? Will she take the \$200 and run? Can the group form under such incentives?
- (e) Now suppose these women are all neighbors. Someone who reneges on her commitment to the group will be socially ostracized. What is the smallest dollar value of the social cost that convinces the first person to get the payout to show up the next month? Does your answer explain why ROSCAs are common in poor villages or communities where everyone knows each other and the savings are small, but virtually unknown in rich anonymous cities where the savings are large?
- (f) A ROSCA is a group coming together to make a loan to one member. Why does a ROSCA work when a formal banking institution would not be able to make the same loan? What mechanism do microcredit institutions use that is similar?
3. **Aid around the world** Go back to www.gapminder.org. Plot income per person on the x-axis, and aid received per person on the y-axis (aid variables are under the economy section when you click on the y-axis variable) .
- (a) One might suppose that aid should go to the most needy. Is there any support for this supposition? Ignoring the many countries who get zero and so are not plotted, does there seem to be much of a relationship between income and aid?
- (b) Follow Zambia and South Korea over time. From these two paths, is it possible to conclude whether aid has any effect on growth? Explain how the path of Zambia makes it difficult to conclude that aid is always good for growth.
- (c) Now plot aid given as % of GNI on the y-axis. Which country gives the least aid (as % of GNI) of those listed? Approximately how many countries have higher Income per person than this country (note income per person is not in terms of PPP)?
- (d) Now plot “Aid Given” on the y-axis, which shows the total dollar amount of aid. Which country gives the most aid of those listed? Approximately how many times larger is the amount of aid this country gives compared to the next most generous country?
4. **Calculating the risk premium.** Suppose the cost of funds to a money lender is 20% and a lender is considering making a loan of \$100. For each situation calculate the minimum interest rate at which the lender is willing to make the loan.
- (a) The borrower will repay the loan with interest with probability 1/2 and nothing with probability 1/2.

- (b) The borrower will repay the loan with interest with probability $1/2$ and only the principal (no interest) with probability $1/2$.
- (c) With probability $1/3$ the loan and interest is repaid, probability $1/3$ only the principal is repaid, and with probability $1/3$ nothing is repaid.