

Supervision 1: Part IIB Paper 8  
Professor Munshi

1. Consider a bank which provides a loan to a farmer each year on an infinitely repeated basis. The bank has no way to recover the loan if the farmer chooses to default, but no other sources of credit are available and so he will receive zero profits forever after if he does. The farmer discounts the next period's earnings by a discount factor ( $\delta=0.5$ ), where each period corresponds to a year.

The farmer uses the loan for cultivation. Cultivation can be done using one of two techniques. The first requires initial working capital (loan size) of \$100 and produces output or payoff worth \$300. The second requires \$500 of working capital and yields an output of \$1000. Ignore the time-lag between planting (receipt of the loan) and harvesting (receipt of the payoff) in a given year in your calculations below.

(a) Find the loan size that the bank will advance to the farmer each period to maximize its own profit. Assume that the bank pays zero interest on its own capital. What interest rate will it set on the loan that it makes to the farmer? What profit does the bank make? What profit does the farmer make?

(b) We assumed in class that the bank would set an interest rate that forced the borrower's profit down to zero. However, you should have found above that the farmer would make a positive profit in each period. Explain clearly why this difference arises.

(c) Now suppose that the bank can keep some of the farmer's assets (like his wife's jewelry) as collateral, which it will seize in the case of a default. The present value of the assets to the farmer is \$300. Recalculate the optimal loan amount, interest rate, and profits to the bank and farmer in this case.

(d) You should have found that the bank will continue to advance the same loan amount with collateral as it did without collateral in part (a). However, the profits that the farmer and the bank receive will now change. Explain clearly in which direction they will change and why.

2. Marriage in India is endogamous: individuals can only marry within their sub-caste. In contrast, marriage in sub-Saharan Africa is exogamous: individuals must marry outside their clan. This implies that marriage in sub-Saharan Africa is accompanied by membership in a new affine network organized around the wife's family and that men must often bring home their brides from far away. Can you provide an economic explanation for these differences in marriage rules? Hint:- Look for trade-offs.

References:

Debraj Ray, *Development Economics*, Princeton University Press, Chapters 14 and 15.  
Munshi, Kaivan and Mark Rosenzweig. 2014. Networks and Misallocation: Insurance, Migration, and the Rural-Urban Wage Gap, University of Cambridge, typescript.