

Department of Economics
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ECON239: Development Economics

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Assignment #2 — Answer Guide

Due Date: Monday November 16, 2009

Section A (40 percent): Discuss the validity of each of the following statements. In your answer define or explain as precisely as possible any terms or concepts which are underlined, with particular reference to the context in which they are being used. Your answer should be no longer than a page (single-spaced), and you should include diagrams or examples where appropriate. All questions have equal value.

A1. The idea that historical settler mortality rates were a key determinant of current economic development via their impact on economic institutions is consistent with the Chicago School view of economic development.

According to recent empirical research, the relative economic performance of many countries may have more to do with the way in which they were colonized by European powers and the nature of institutions that resulted. According to Acemoglu et al. (2000), differences in settler mortality rates had important impacts on the nature of colonization. Settler mortality rates refers to the rates of death due to disease that could be expected by colonizers. The diseases in question (mainly malaria and yellow fever) were pre-existing in the indigenous populations, but over time those populations had built up immunities to them (just as Europeans had built up immunities to influenza, etc.). In the absence of colonization, these diseases need not have had adverse consequences on economic development of some countries relative to others. However, with colonization by European powers, those countries which had indigenous diseases which were fatal to the colonizers (often the most populated) subsequently fared badly relative to those countries which did not. One interpretation of this observation is that the nature of colonization by the European powers was endogenously determined by these disease rates and, in particular, that those powers set up European style institutions in countries where they were able to settle, but “resource-extracting” institutions in countries where they could not. According to the empirical evidence of Acemoglu et al. (2000), the consequences of this variation in the nature of colonization have persisted to the present day.

The Chicago school view is that although “non–market institutions” often replace pure markets, they achieve the same efficient outcomes as predicted by neoclassical theory (at least in the long run). According to this view, the private–sector creates different institutions to minimize the costs involved in undertaking a transaction, but that this has no consequences for efficiency. Thus, the Chicago school of thought typically argues that variation in institutions across countries should not matter much for relative economic performance in the long run. In this sense, the evidence seems inconsistent with this view of development. On the other hand, one caveat to this is the role of property rights, the enforcement of which is seen by Chicago school economists as the key role of government. If the main institutions that are varying across countries have to do with the enforcement of property rights then the Chicago school view would be consistent with this evidence. The measure of current institutional quality used by Acemoglu et al. (2000) is “risk of appropriation” of investment returns which is indeed tightly linked to property rights.

A2. The evidence that sharecropping results in low productivity suggests that people in the rural sector of many developing countries are irrational.

The tenancy arrangement of sharecropping has been common in various countries of the world for centuries, although it is less prevalent now than in the past. The evidence provided by Shaban (1987) and others suggests that sharecropping tenancy relationships lead to lower productivity than fixed rental agreements, because they offer low incentives for effort and investment. Given that sharecropping is so persistent, one might think that this implies that people in the rural sector just haven’t figured this out. However, most economists think it is more likely that the institution of share-cropping serves an important purpose in terms of sharing risk. According to the new institutional school, sharecropping is best viewed as the result of a trade–off between risk and incentives. To see this, suppose that the landlord is risk–neutral, but Tenant is risk–averse. In this case, according to the Chicago school view we would expect to see a wage contract. However, suppose that the Landlord cannot directly monitor the effort of the Tenant, and he cannot infer effort due to the risk in production described above (effort here is a “hidden action”). The **incentive–constrained** or **second–best** efficient value of α is the one where the gains and losses of increasing it any further are just equalized. This is illustrated in Figure 1 by α^* . For any $\alpha > \alpha^*$ the increase in productive efficiency resulting from an increase in the share exceeds the increase in the cost imposed due to additional risk. For any $\alpha < \alpha^*$ the reduction in productive efficiency resulting from a decrease in the share is less than the decrease in the cost imposed due to additional risk. When $\alpha = \alpha^*$, the marginal benefit of increasing the share, AB, is just equal to the marginal cost, CD. Note that this must be less than $\alpha = 0$, so that this outcome as productive as a fixed rental contract, but its the best outcome possible given the informational

constraint.

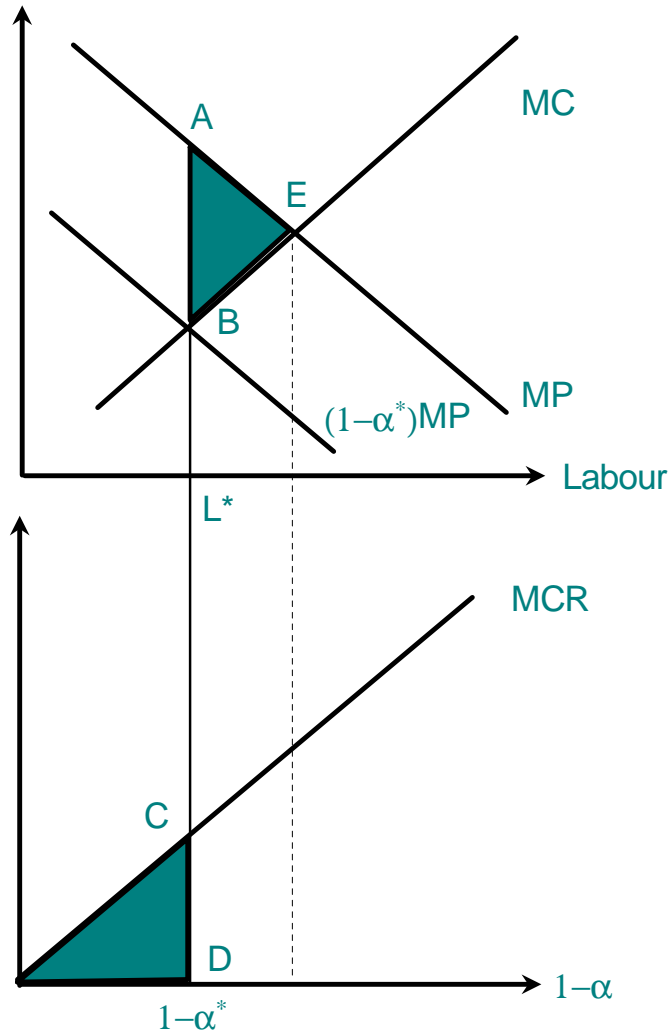


Figure 1: Constrained-efficient Sharecropping Contract

A3. Redistributive land reforms, though potentially Pareto-improving, are politically infeasible.

Redistributive land reform is an often-controversial, government-backed redistribution of agricultural land. Usually ownership is transferred from a relatively small number of wealthy owners with extensive land holdings (e.g. plantations, large ranches, or agribusiness plots) to individual ownership by those who work the land. Such transfer of ownership may be with or without consent or compensation; compensation may vary from token amounts to the full value of the land.

There is considerable evidence from various developing regions that (large-scaled mechanized

farming aside) there is an inverse relationship between farm size and land productivity (output per hectare). One important reason for this seems to be associated with the incentives to provide effort and investment faced by family and permanent labour vs. casually hired labour. Where this is the case then, in principle, redistributive land reforms which transfer land from large landowners to small ones, in return for compensation, can be Pareto-improving (making at least one party better off without making an other worse off). The increase in the output of a small farm resulting from an additional hectare of land must exceed the decreased output of a large farm due to one hectare less of land (see Figure 2). This means that the increase in aggregate output from taking land from large farms and giving it to small farms, should be more than enough to compensate large farmers for their loss. Thus, if the large landowners are appropriately compensated, such a land reform will make both groups better off, thereby achieving a Pareto improvement.

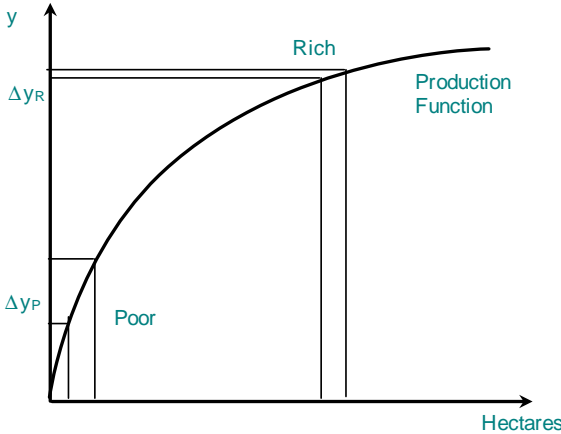


Figure 2: Potential Pareto-improvement due to redistributive land reform

Although there have been some successful redistributive land reforms, in general they tend to be politically infeasible. As Debraj Ray (p. 458) puts it: “It takes tremendous political will (resistance to powerful lobbies, in particular) to push a land reform program through. There is some possibility that large landowners will agree to *some* reform if they are faced with the credible threat of violence or forced expropriation. Otherwise, major land reforms have been the product of political upheavals in society, as in Cuba, Japan, Korea and Taiwan. Political upheaval has the advantage that large landowners are viewed as enemies, or collaborators with the previous regime, and so there is immense popular support for land reform.”

A4. When lenders face problems of adverse selection, rural credit markets may be both inequitable and inefficient.

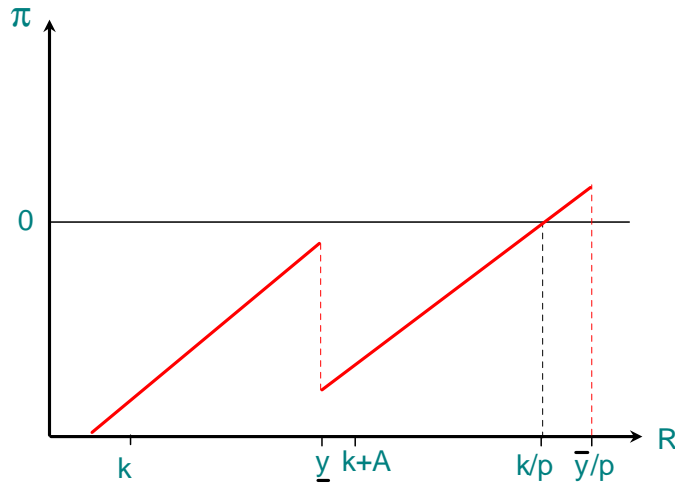


Figure 3: Bank's expected profit with low value of p

Adverse selection in the context of credit markets occurs because standard debt contracts typically involve limited liability. This implies that borrowers are effectively insured against downside risk — if they default, their income does not depend on the outcome of the investment. Consequently, for investments with the same average return, riskier borrowers have higher expected income and are able to pay a higher rate of interest on their loans. If lenders cannot perfectly observe the riskiness of borrowers, they cannot set interest rates to reflect the risk involved in a specific lending situation. Adverse selection occurs when lenders raise their interest rate beyond the point where it is profitable for safe borrowers to stay in the market. When the riskiness of some borrowers is sufficiently high it may not be possible for the lender to set an interest rate low enough that safe borrowers remain in the market and still break even.

Figure 3 illustrates how the expected profit of a lender might vary with the repayment required on its loans, R , when there are two types of borrower: safe and risky. Initially profits rise with R , but at some point safe borrowers drop out of the market because their return will be less than R . In contrast, risky borrowers stay in because they are insured against downside risk (due to limited liability). At this point, expected profits fall abruptly and then rise again with R . As illustrated here, the only situation in which the lender can at least break-even is where it only lends to risky borrowers at a high rate.

Inefficiency refers to a situation in which someone could be made better off without making anyone else worse off. In this context, because of adverse selection, some borrowers do not undertake investments which, in the absence of informational asymmetry, would generate economic surplus — this is inefficient. Moreover, this situation is inequitable because some borrowers are

denied access to credit when others receive it, even if the average value of their returns are equal.

A5. Credit rationing by formal sector banks in the rural sector of LDCs can be viewed as a response to the consequences of limited liability and asymmetric information in lending.

Credit rationing occurs when banks are unwilling to advance additional funds to a borrower even at a higher interest rate. In effect, it is a situation in which the demand for formal sector loans exceeds the supply of these loans at the lending rate quoted by the banks. Limited liability means that, in the event of default, a borrower is not liable for more than the income from his investment plus any collateral that has been agreed upon. As a result of limited liability borrowers are effectively insured against downside risk. Consequently, amongst investments with the same expected return, borrowers may prefer the one with the most risk because it has the best upside potential. When the bank raises its interest rate this may induce borrowers to take actions that lead to riskier outcomes (or induce safer borrowers to exit the market). As a result, the bank's profit will start to fall when it raises the interest rate.

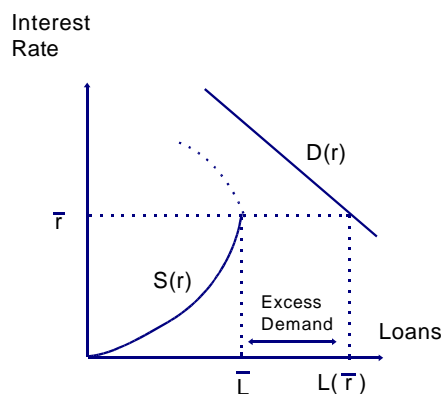


Figure 4: Credit Rationing

Suppose there is excess demand in the credit market. In the standard neoclassical model, the interest rate would rise to “choke-off” demand. With asymmetric information and limited liability, although a higher interest rate may initially raise returns to the bank, eventually the increased risk induced by it will offset this effect. It follows that the credit supply curve will be backward bending at some point, as shown in Figure 4 and as a result, demand may exceed supply with no tendency for the interest to rise. This is a situation of credit rationing: an under-supply of credit and an interest rate ceiling at i^* . (If a development bank tried to meet this excess

demand, it would therefore make a loss on average, which would make it financially nonviable.)

Section B (60 percent): Answer the following **Long Questions**.

B1. Please read the article “The Evolution of the World Bank’s Land Policy: Principles, Experience and Future Challenges” by Deininger and Binswanger, and answer the following questions. Answers may be provided in point-form. The article can be downloaded from the Course Outline page of the ECON239 web site.

- (a) How has experience with land reforms challenged the World Bank’s earlier assumptions as reflected in its 1975 Land Reform Policy Paper”?
- (b) What advantages do owner–operated farms have over larger operations ? What factors could outweigh these advantages ? Explain.
- (c) Summarize the main problems that lead land markets to perform imperfectly. Why are “distress sales” likely to lead to inefficient land allocation ? Why might rental markets be more efficient in some cases ?
- (d) Why does the World Bank support redistributive land reform ? What factors are responsible for their common lack of success ?
- (e) How has the World Bank’s thinking changed with respect to communal tenure systems ? Explain why.

B2. Suppose the relationship between the value of crop yield net of production costs, y , and farm size in hectares h , in a particular region is given in the following table:

h	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
y	118	135	151	166	180	193	205	216	226	235	243	250	256	261	265

(a) Plot this relationship on graph paper (or using a spreadsheet), placing hectares on the x -axis and yields on the y -axis. Farmer A has 5 hectares of land and Farmer B has 15 hectares of land. What is their total combined yield, net of production costs ?

The plot should yield a concave relationship (i.e. one that exhibits diminishing returns). The total combined yield is $151 + 256 = 407$.

(b) If you were Farmer A, what is the highest price, \bar{p} , you would be willing to pay for one more hectare of land. Make the same calculation for Farmer A’s maximum

purchase price for one additional hectare if he initially owned 6, 7,..., 16 hectares of land. Plot the curve representing the relationship between hectares bought and Farmer A's maximum purchase price. What would you call this curve?

The highest sale price acceptable to Farmer A at each level of hectares bought is given by

h bought	1	2	3	4	5	6	7	8	9	10	11	12
\bar{p}	15	14	13	12	11	10	9	8	7	6	5	4

This is Farmer A's demand curve for land.

(c) If you were Farmer B, what is the lowest price, \underline{p} , at which you would be willing to sell a hectare of land. Make the same calculation for Farmer B's minimum sale price for if he initially owned had 14, 13,..., 4 hectares of land. Plot the curve representing the relationship between hectares sold and Farmer B's minimum sale price. What would you call this curve?

The lowest sale price acceptable to Farmer B at each level of land-holding is given by

h sold	1	2	3	4	5	6	7	8	9	10	11	12
\underline{p}	6	7	8	9	10	11	12	13	14	15	16	17

This is Farmer B's supply curve for land.

(d) If the two farmers were able to trade land freely, what would you expect their respective landholdings to be after trade? Explain. What would their total combined yields net of production costs be in this case?

The farmers would trade until they no longer can agree on a mutually acceptable trading price. That is as long as $\bar{p} > \underline{p}$. This is the case until both farmers have 10 hectares (i.e. until 5 hectares are traded). At this point, Farmer A will only buy at a price less than 10 and Farmer B will only sell at a price exceeding 11. When both farmers have 10 hectares, their combined yield is $2 \times 216 = 432$, which exceeds the pre-trade output by 6%.

Now suppose that, by coercing a local politician, Farmer B, is able to gain fully subsidized and exclusive access to a new high-yield variety of crop. As a result, her land-production relationship shifts and becomes

h	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
y	354	405	453	498	540	579	615	648	678	705	729	750	768	783	795

Farmer A's production opportunities do not change.

(e) Starting from the initial situation where Farmer A has 5 hectares and Farmer B has 15 hectares, would you expect Farmer B to sell land to Farmer A at a mutually acceptable price ? Explain.

The subsidy has effectively tripled output at each hectare level. The lowest sale price acceptable to Farmer B at each level of land-holding is now given by

h	15	14	13	12	11	10	9	8	7	6	5	4
p	18	21	24	27	30	33	36	39	42	45	48	51

In this case, even at 15 hectares, the lowest price acceptable to Farmer B is 18, whereas Farmer A will pay no more than 15. In other words, there is no mutually acceptable price at which Farmer B can sell to Farmer A.

(f) What would you predict would be the consequences of allowing free land trade in this case ? Explain. Do you think this would happen if the two farmers had equal access to the subsidies ?

If Farmer B increased her landholdings from 15 to 16, her output would increase by 15. If Farmer A reduced his landholdings from 5 to 4 his output would fall by 16. So they also would not be able to find a mutually acceptable price at which Farmer A can sell to Farmer B. It follows that the consequence of allowing free trade in this case would be that no land transaction would occur at all.

Suppose that if they both have access to the subsidies, they both experience a doubling of their yield at each hectare level. Effectively this would double the minimum and maximum trading prices, but would not change the overall conclusion reached in part (d): the two farmers will trade until each owns 10 hectares.

B3. In a given year, Aleem receives 100 loan applications for 200 Nairu each. He spends a total of 2 working days and 10 Nairu obtaining information about an applicant for each loan. He expects to lend to 50% of those farmers who apply for a loan. Aleem also runs a store where he can earn 20 Nairu per day when open. He incurs 8000 Nairu per year in overheads. Aleem obtains funds at a cost of 10% and faces no bad debt or late repayment problems.

(a) What is the expected cost to Aleem of an additional loan, as a percentage of the loan size ?

$$\begin{aligned}
 \text{Screening Cost} &= \text{Monetary Cost} + \text{Opportunity Cost of Time} \\
 &= 10 + 40 = 50 \\
 &\quad 9
 \end{aligned}$$

This is the cost of each application. Since half of the applications will be unsuccessful, the screening cost per loan actually made is 100 Rs. In addition, each loan requires a capital cost of $0.10 \times 200 = 20$ Rs. so that the marginal cost of a loan is 120. Expressed as a percentage of the loan:

$$MC = \frac{120}{200} = 60\%$$

(b) Calculate the average cost of administering a loan as a percentage of the loan size. Assume that overhead is allocated to different activities in proportion to the time spent in each and that there are 320 working days per year (after removing holy days and family occasions, etc.).

Since marginal cost is constant, it follows that average variable cost (*AVC*) must equal *MC*. Thus, average cost is given by

$$AC = 60\% + AFC$$

where *AFC* is the average fixed cost. The relevant average fixed cost depends on what assumptions we make about how Aleem's overhead cost should be allocated between his lending and trading activities. One way to attribute the overhead is to make it proportional to the time spent in each activity. Aleem spends a total of 200 days in the screening activity. Let us suppose there are 320 working days during the year (after removing holy days and family occasions, etc.). Thus, the time allocated to lending is 5/8ths of the total. Then the effective average fixed cost is about $5000/50 = 100$, and so the average cost is

$$AC = 60\% + 50\% = 110\%$$

(c) What interest rate should Aleem optimally be charging if the credit market is in a long-run equilibrium with free entry? Explain.

Assuming that the average cost is calculated in the way discussed in the second case above, the interest rate charged should be $r^* = 110\%$. This is because in the long run, there are zero profits (otherwise there would be further entry), which implies that the demand curve for Aleem's loans must be tangent to his average cost curve (see Figure 5). The marginal cost of funds is given by $r = 10\%$.

(d) What are the implications of market segmentation and localized monopolistic competition for government attempts to expand formal credit in the rural sector?

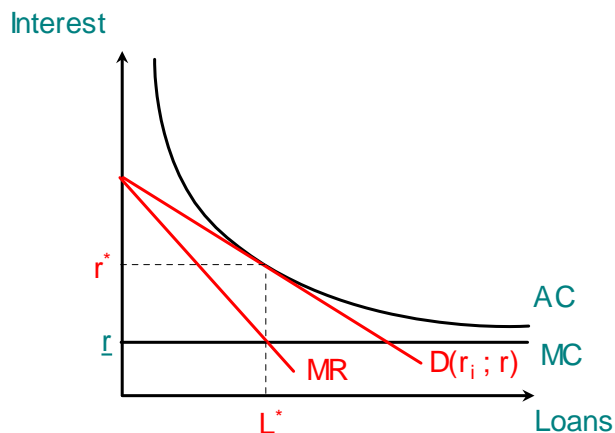


Figure 5: Long-run Equilibrium after Entry

Monopolistic competition arises when the individual lender's market demand curve is downward sloping due to market segmentation and borrower loyalty, but is still sensitive to other lenders' interest rates (ie. there is competition). The implication is that due to borrower loyalty and due to the high and differential costs of screening, it may be very difficult for "outsiders" (e.g. formal banks and government subsidized banks) to compete with local moneylenders. In order for the government to extend credit at relatively low interest rates, they must design and create economic institutions which reduce problems of asymmetric information and provide incentives for repayment. Examples include group lending and peer monitoring, the hiring of local moneylenders by the government, and the creation of trading-lending interlinkages by government sponsored banks.

(e) An alternative policy is to offer low-interest lending to money-lenders, such as Aleem, so as to lower their costs of funds. Explain why this may not result in low interest rates loans to the borrowers.

Under monopolistic competition, there are two affects of lowering moneylenders' costs of funds. First, it lowers their average costs which will lead them to offer lower interests in the face of competition. However, another effect is that it leads to greater entry into the lending market. As more lenders enter, they may steal business from existing moneylenders so that the average amount lent by each lender falls. Since the lenders faced fixed overheads costs (which is why their AC curve slopes downwards), the fall in the amount lent will raise their average cost. The overall effect depends on the relative size of these two effects. Figure 6 illustrates the perverse case where the interest rate rises.

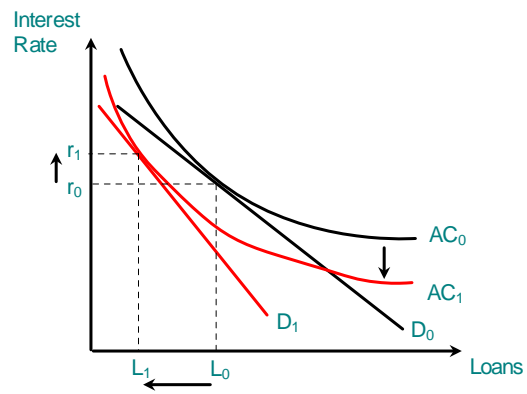


Figure 6: Potential Perverse Effects of using Moneylenders as Agents