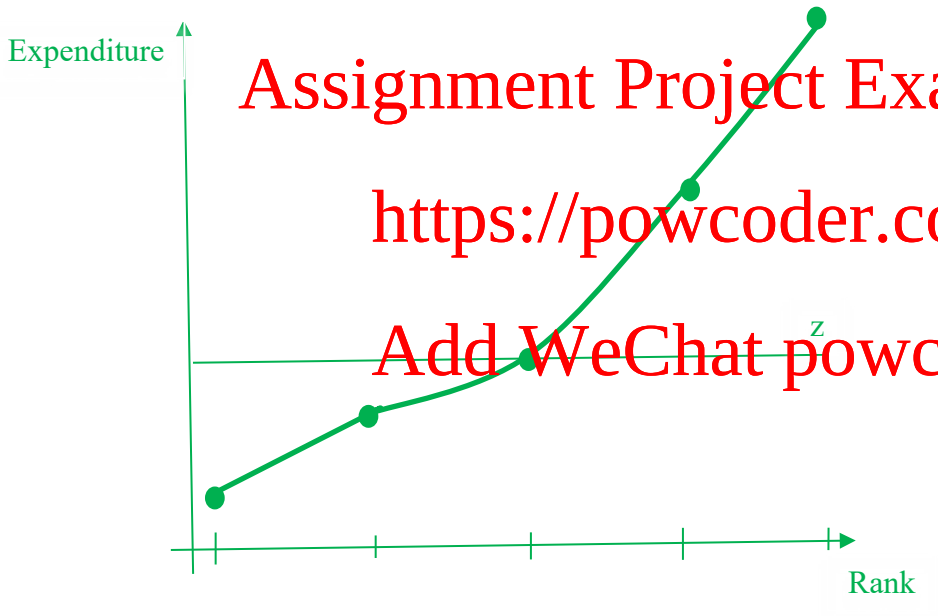
ECOS3002 – Development Economics

Mid-Semester Exam
Semester 2 – 2021
Marking Guide

Excessively unclear or badly written answers may be deducted, usually 0.5-1 mark per question.

Section 1. Draw, calculate, interpret

1. (15 points) Poverty analysis. Suppose a village has 5 households, with expenditure levels 1, 3, 4, 7 and 10. Suppose the poverty line is 4.
    a. (5 points) Draw the poverty profile for this village, including the poverty line.



Marking guide:

- Full marks: full figure with objects in correct places.
- Deduct 1 mark for each of: discrete dots in wrong places, missing connecting line, poverty line, or either axis label.

    b. (5 points) Calculate P0, P1, and P2 for this village.

Denote: total population = n, poverty line = z

P0 = [# strictly below z] / n
= 2/5
= 0.4

P1 = [poverty gaps for those strictly below z] / [n*z]

= [(4-3) + (4-1)] / 5*4
= 4/20
= 0.2

P2 = [ratio of poverty gap to poverty line for those strictly below z] / n
= [((4-3)/4)^2 + ((4-1)/4)^2] / 5
= [1/16 + 9/16] / 5
= [5/8] / 5
= 1/8
= 0.125

Marking guide:

- Deduct 1.5 marks for each incorrect final answer, if no workings. Only deduct 1 mark for incorrect answer if workings clear and correct (if workings are a mess, deduct 1.5). So: they are not penalized for not having workings, but they can possibly only get part marks if they do have workings.

c. (5 points) Suppose you have a budget of 3 to spend on reducing poverty in this village. How you would allocate this budget if your objective was to most reduce P0, P1, or P2, respectively?

P0: give the household with y=3 at least 2 units to move them to the poverty line, allocating the remaining units however you want, or give all 3 units to the household with y=1.

P1: give it all to the households with y=1 and y=3 in any way you want, as long as you give no more than 1 unit to the household with y=3.

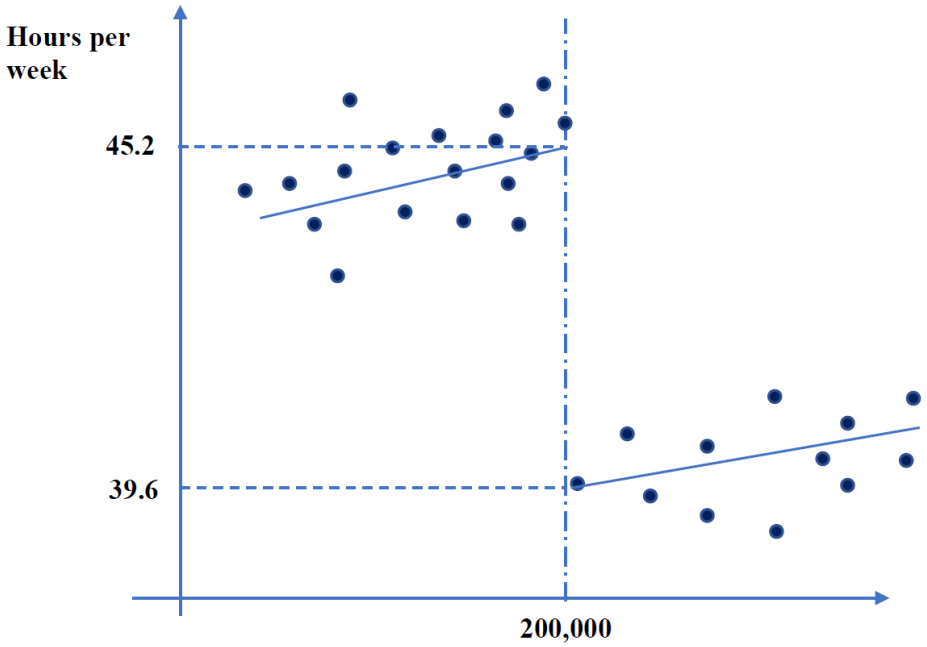
P2: give 2.5 units to the household with y=1 and 0.5 units to the household with y=3.

Marking guide:

- Deduct 1.5 marks for each fully incorrect final answer, giving partial marks for partially correct answers (e.g., if they don't address where all 3 units would go, or precisely how they would be allocated).

Section 2. Interpret a quasi-experiment

2. (10 points) Interpret a regression discontinuity (RD) quasi-experiment. Suppose that the government of Jakarta, Indonesia, wants to increase women's workforce participation. Prior research suggests that lack of access to affordable childcare is one of main barriers to workforce participation of mothers, particularly for women from lower-income households. Suppose that the government offers a 50% childcare subsidy for approved childcare facilities, to households below a poverty threshold of 200,000 Rupiah per capita, per month. Two years after the subsidy is implemented, you are asked to evaluate the subsidy program. Suppose that you decide to use an RD design, collecting representative data from households just falling above and below the cutoff, and decide to study the effect of the subsidy on hours worked per week.
    a. (5 points) Interpret the results of the RD from the following figure, including providing the RD estimate of the impact of the subsidy.



This figure suggests that the childcare subsidy causes an increase of 5.6 hours worked per week, for households with less than 200,00 Rupiah per capita, per month, or about a 14.1% increase in hours worked, at the cutoff. This suggests that the intervention is effective in increasing the work force participation of low-income women.

However

- This is only a local average treatment effect (LATE). We don't know if the same effect applies to women from households with significantly more or less than 200,000 Rupiah per month.

- We don't know if this effect is statistically significant (though from the figure it appears extremely likely to be significant).
- Absent more information, like the cost of childcare, the hourly earnings of women, or subjective outcomes like women's satisfaction with the program, we can't assess whether this policy meets a cost-benefit standard.

Marking guide:

- 4/4.5/5. Some combination of pointing out this is a 14.1% effect, and the above discussion under "However," with more of it earning a higher mark.
- 3.5. Correct numerical answer (5.6) without much interpretation.
- 2.5/3. Correct numerical answer with incorrect interpretation (to extent of incorrectness).
- 2 or below. Combinations of incorrect numerical answer with missing or incorrect interpretation.

b. (5 points) Name one potential threat to the validity of this RD design, and what you would do to test for it.

- Households might genuinely earn less income or have less expenditure, or underreport their income or expenditure, in order to get below the 200,000 Rph threshold, if they know that this will allow them to take advantage of the subsidy. If that were the case we would expect an extra mass of observations just below the cutoff, which we could test for with an RD density test. If dots in the above figure represent individual observations, then this doesn't appear to be the case. However if the dots represent household income bins, then we can't

tell very much about this problem from the figure.

- This appears to be a sharp RD design. This is appropriate if we assume perfect compliance with the treatment. If there is a chance of imperfect compliance, i.e., households over 200,000 Rph gaining access to the subsidized childcare even if they shouldn't qualify (e.g., due to paying a bribe), or mistargeting whereby people who should qualify aren't reached with the subsidy, then we may be underestimating the effect of the treatment, because both sources of mistargeting will move the outcomes of people in one group closer to the outcomes in the other group. This could be tested for by following up with households above and below the cutoff to verify if they are actually receiving the subsidy. In this case a "fuzzy RD" design would be more appropriate, using 2SLS to estimate the effect.
- Other observable and unobservable characteristics of these households should be "smooth" through the cutoff, i.e., if we ran a set of key observables as outcomes in the RD setup, we would not find any significant effect (no discontinuity). A violation of smoothness, while unlikely at an arbitrary cutoff, could be possible if that characteristic were related to earnings. For example, suppose that 200,000 per month is a minimum wage rate, and in order to qualify for this wage rate, people need to have some educational qualification.

Marking guide:

- 5. Fully explain a valid threat to validity (what it is, how it might happen), and how they would test for it.
- Deduct 1 mark for each of: failing to explain the threat to validity (what it is, and how it might happen), how they might test for it

3. (5 points) Risk coping and risk management. Suppose that a household in a rural area of inland Papua New Guinea has a hectare of land that it uses to grow cassava, and a pond that it uses to produce fish as a source of protein and its main cash crop. It uses this cash income to buy other necessities – food, clothing, mobile phone coverage, etc. Suppose that there are many fish ponds in the area, and diseases can be transmitted between the ponds by birds and rodents, which can occasionally kill all the fish. Name one risk coping strategy and one risk management strategy the household might use to address this risk.

- Possible risk-coping. If the fish have been killed:
  - Diversify into other sources of cash. For example, off-farm work. This could involve adult family members, or asking children to do so.
  - Reducing cash consumption, so there is a lower need for cash.
  - Attempt to get an emergency loan until the fish stock can be replenished.
  - Dis-save productive assets.
- Possible risk-management:
  - Diversify into other sources of cash income outside fish ponds.
  - Precautionary cash savings from fish income while things are going well.
  - Participate in a mutual insurance scheme, ideally with households that aren't also reliant on nearby fish ponds (susceptible to the same risk).

Marking guide:

- 5. List at least one risk-coping and one risk-management strategy, with a succinct

explanation of how each would be applied to address the above case.

- Deduct 1 mark for each strategy that is missing, and each succinct explanation that is missing.
- Deduct 1 if they suggest microinsurance, as this isn't realistically a risk that is viable to insure (it would be hard to index for localized disease outbreaks).

4. (5 points) Evaluate a randomized control trial (RCT). The World Bank is working with the International Rice Research Institute office in Cambodia to study the effectiveness of the System of Rice Intensification (SRI), using an RCT. In 100 villages in the northern part of the country, they will randomly sample 20 farm households in each village, from a list of all households in the village. In each village, 10 of the 20 households will be randomly selected into the Treatment group, receiving SRI training and a set of inputs (e.g., fertilizer, seeds, tools) at a heavily discounted price, and the other 10 households will be the control. Comment on the internal validity and the external validity of this RCT design.

Internal validity. While RCTs have high internal validity in general, the proposed RCT has relatively low internal validity because randomization is within-village (10 treatment – 10 control) rather than between-village (e.g., 50 treatment, 50 control). An intervention like SRI, which is about a knowledge transfer, is likely to have spillover effects within the community (from Treatment to Control). This would lead to a violation of the SUTVA assumption.

External validity. The description is not clear about how the 100 villages are selected, so in absence of saying so, we can probably assume that they are not necessarily representative even of villages in northern Cambodia. Hence, the study also has relatively low external validity, though this is less unusual for RCTs.

Marking guide:

- 5. Correctly identifying that the study has relatively low internal validity, in spite of being an RCT, and relatively low external validity, and succinctly explaining why.
- Deduct 1 mark each time the assessment of internal or external validity, and/or the succinct explanation, is incorrect or missing.

5. (15 points) Short essay. Suppose you are talking with a government agricultural extension worker who is working with maize farmers in a set of remote villages in Ghana. The extension worker points out that the international price of maize has been steadily rising over the last year, yet the farmers she works with have barely changed their production choices over maize. Explain why this may not necessarily be inconsistent with rational economic behavior, giving at least three reasons, making precise use of concepts from ECOS3002 to illustrate your arguments.

In development economics we have studied a number of ways of showing that behavior that may initially appear to be irrational, i.e., inconsistent with optimizing utility subject to income-earning opportunities, is actually consistent with rational economic behavior.

Possible explanations:

- Disconnection from markets (which may result in a lack of separability). In this case market prices may not matter so much for household production decisions, because the household doesn't have access to markets (e.g., for selling maize).

- Although they produce maize, the farmers are net buyers of maize. In this case they still want to produce the same amount of maize, though they may buy less additional maize in the market if the international price translates into the local price (they may substitute some of their maize purchases for another food product).
- Market failures in saving or credit access. Farmers may simply not have the resources to change their production (input) decisions over maize, because they are already maximizing the amount they can invest. This may be particularly relevant if they don't have good ways to save, so they use up most of their resources between harvest and the next planting season.
- Failures of value chain pass-through. Though international prices are rising, for them to reach smallholder farmers they need to "pass through" the value chain – traders need to the willing to pay a higher price to farmers, who in turn receive a higher price for aggregators and processors, who in turn receive a higher price from distributors, and so on. Due to market power, lack of information, or other reasons, prices may fail to pass through to farmers, so changes in the international price don't translate through to them.

Marking guide:

- 9. Provide 3 explanations from the above or another suitable explanation from ECOS3002: (i) name the concept, (ii) succinctly explain it, and (iii) explain how it is relevant in rationalizing the puzzle in the problem.
    - Deduct 1 mark if any of the 3 points (i, ii, iii) fail for any of the 3 explanations, or if the explanation is not clearly written.
- 3. The essay provides a succinct explanation for how concepts we have studied in ECOS3002 can rationalize behavior that might initially appear irrational or uneconomical. It is up to the author whether to do this once (e.g., at the start or end of the essay), or to make this point for each of the 3 explanations.
    - Deduct marks if the explanation is missing or the extent to which it is not coherently make this point.
- 3. The essay is well-written, with clear and coherent prose, with good grammar, spelling and other stylistic elements.
    - Deduct 1 mark for the extent to which the essay is not well written.