Written Exam for the M.Sc. in Economics Summer 2010

Advanced Development Economics: Micro Aspects

Re-exam

RETTEVEJLEDNING

Date 17 August 2010

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

Question 1:

(a) Describe and illustrate the 3 main points that can be deduced from the Preston Curves (relationship between life expectancy and income).

First, people in richer countries can expect to live longer than those in poor countries.

Second, as indicated by the upward shift of the Preston Curve, there have been dramatic improvements in the health of populations over time. These improvements have been greatest among the poorest. If all the improvements in health were driven by aggregate income growth, countries would have merely moved along the Preston Curve over time. The upward shift of the curve suggests that factors other than income are important.

Third, in 2004 there are several countries where life expectancy is substantially lower than its predicted level. Have the technological improvements of the last 70 years passed over these countries? HIV/AIDS and lack of "oil benefits".

Luo, Mu and Zhang (2006) studied the effect of the great Chinese famine of 1959-62 on body mass. The famine Killed between 20-30 million people – mainly in rural areas and unevenly distributed across provinces.

(b) Based on the below table describe the identification strategy pursued and outline the main results.

Long-run impact of the Great Chinese famine (food crisis) of 1959-1962 on body mass. Killed between 20-30 million people – mainly in rural areas and unevenly distributed across provinces. Examines the BMI in adulthood comparing those born during the famine or soon after. The table presents the probability of overweight for women in different categories. Panel A compares the probability of overweight individuals who were born during 1963–6 and therefore had no exposure to famine, with that of individuals who were born during 1959–62 and exposed to famine, in both types of provinces. For the famine cohort, the probability of being overweight is higher in the provinces that experienced more severe famine. For the young cohort, however, the probability is higher in provinces subject to less severe degree of famine. In both types of provinces, the famine cohort has higher overweight probability than the younger cohort. The double difference between cohorts and provinces is significantly larger in the famine cohort in severe provinces. Can be interpreted as the **causal effect** of the famine, under the assumption that in the absence of famine, the differences between the cohorts would not have been systematically different in severe and less severe provinces. This identification strategy may be invalid if the pattern of differences in cohorts varies systematically across provinces. However, this identification assumption can be tested using younger cohorts who were born after the famine and therefore were not subject to famine. Panel B: The difference in the probability of overweight between younger cohorts does not differ systematically across provinces. Panel C: Control experiment because in general urban residents were not subject to severe famine due to favorable food entitlements. The results in Panels B and C suggest that the double difference estimator is based on valid assumptions.

(c) Explain the three main (bias related) problems in the analysis carried out in Luo, Mu and Zhang (2006)?

Find that women born during the famine are more likely to be overweight 30-40 years later - No difference for men.

Other changes across time and across regions (provinces) explain these differences.

If more frail babies died during the famine, or were not brought to term, they might have been in worse health later in life, which would bias even a diff-in-diff estimator against finding significant effects.

Question 2:

Consider a household that is jointly engaged in production and consumption. Household utility depends on consumption (c) and leisure (l). Let p be the price of output, w the wage of labor and r the price of one unit of land. The household can produce the good on its farm according to the concave production function $F(L, A)$, where A is the area cultivated by the household and L is the amount of labor used on the farm. Let E^L be the household endowment of time and E^A the household endowment of land.

(a) Assume complete markets and set up the household maximization problem. Show and describe the so-called "separation property" of the agricultural household model (AHM).

Consider the following problem of a household that is jointly engaged in production and consumption. Household utility depends on consumption (c) and leisure (l). Let p be the price of output, w the wage of labor and r the price of one unit of land. The household can produce the good on its farm according to the concave production function $F(L, A)$, where A is the area cultivated by the household and L is the amount of labor used on the farm. Let E^L be the household endowment of time and E^A the household endowment of land

(1) $\max U(c,l)$

subject to

(2) $pc + wL^h + rA^h \leq pF(L, A) + wL^m + rA^m$

(3) $L = L^f + L^h$

(4) $A = A^f + A^h$

(5) $E^A = A^f + A^m$

(6) $E^L = L^f + L^m + l$

(7) $c, l, L^f, L^m, A^f, A^m \geq 0$

Maximization is with respect to consumption (c), leisure (l), hired labor (L^h) and land (A^h), labor (L^m) and land (A^m) supplied to the market, and labor (L^f) and land (A^f) used on the farm.

Reduces to:

(1) $\max U(c,l)$

subject to

(7*) $pc + wl \leq \pi + wE^L + rE^A$

(8*) $\pi = pF(L, A) - wL - rA$

Maximization problem: max (1) s.t. (7*), (8*) and (9*). Notice that (1), (7*), (8*) and (9*) can be solved in two steps: First maximizing (8*) with respect to L and A, and then solve (1) subject to (7). This illustrates the separation property: Consumption decisions are separable from production decisions. The question could also be answered using the graphical representation outlined in Chapter 2 in Bardhan and Udry (1999).

(b) Assume now that there is no land market combined with a binding constraint on the time spent by the household working for a wage in the labor market (involuntary unemployment). Describe graphically what happens to the "separation property".

No land market: r=0 and E(A)=A. Binding constraint in labor market: L(m)=M and L(h)=0. The maximization becomes

(*) $\max U(c, l)$

Subject to

(**) $c = F(E^L - M - l, E^A) + wM$

The household production choices depends on its preferences and its own endowments, and the separation property does not hold. Illustrate as in Figure 2.2 page 12 in Bardhan and Udry (1999)

(c) Discuss the relationship between farm size and land productivity.

(*) and (**) leads to $\max U(c, l) = \max U(F(L, E^A) + wM, E^L - M - L)$

FOC: Necessary and sufficient

$$H = U_c'(c, l) F_L'(L, E^A) - U_l'(c, l)$$

Use implicit function theorem $\dfrac{dL}{dE^A} = -\dfrac{H_{E^A}'}{H_L'}$, CRTS conditions and the imposed assumption

$U_{cl}'' \geq 0$ to obtain equation (16) in Bardhan and Udry (1999) leading to the conclusion that

$\dfrac{dL}{dE^A} = \left(\dfrac{L}{E^A}\right) \Omega < \left(\dfrac{L}{E^A}\right), where\ \Omega < 1$. Figure 2.2 can effectively be used to illustrate the

mathematically derived result and the main point that as household's endowment of land increases, the intensity with which it cultivates declines.

Question 3:

Microfinance institutions need to reduce their reliance on subsidies. One suggestion has to increase interest rates given the assumption that poor people are rate insensitive. Karlan and Zinman (2008) test this assumption of price inelastic demand.

(a) Explain the identification problem in Karlan and Zinman (2008) and the way they address this.

Credit environment: Randomized trials conducted by a consumer lender in SA. One lender - working for profits in a high-risk consumer loan market. Cash loan borrowers generally lack the credit history and/or collateralizable wealth needed to borrow from traditional institutional sources such as commercial banks. Cash loan sizes tend to be small - but substantial relative to a typical borrower's income. Cash lenders focusing on the highest-risk market segment typically make one-month maturity loans at 30 percent interest *per month*. Informal sector moneylenders charge 30–100 percent per month.

Experimental design: Lender randomized the interest rate offered in "pre-qualified," limited-time offers that were mailed to 58,168 former clients with good repayment histories. offer rate randomization was stratified by the client's pre-approved risk category. Standard rates: low-risk = 7.75 percent per *month*; medium-risk = 9.75 percent; high-risk = 11.75). Randomized rates: between 3.25 to 14.75 per month. 96 percent of the offers were at lower-than-standard rates. Around 1 percent of the offers were at a higher-than-standard rate. Verified that the assigned rates were uncorrelated with other known information, such as credit report score. The randomizations were successful: Conditional on the risk category, the offer rate was uncorrelated with other observable characteristics.

Identification problem: Loan contract terms may be correlated with unobserved investment opportunities, financing alternatives, or supply decisions that are not actually functions of the interest rate or maturity per se. KZ address the identification problem by using interest rate variation created by the Lender's random assignment. The randomly assigned interest rate enables us to observe the counterfactual: what happens to a consumer's borrowing behavior if we exogenously change her interest rate? Cleanest for the extensive margin of price sensitivity

(b) Based on the below table; outline the main results reached in Karlan and Zinman (2008).

Column 1: a 100-basis-point increase in the monthly interest rate reduces take-up by 3/10 of a percentage point. Thus, a price decrease from the maximum (11.75 percent) to the minimum (3.25 percent) rates offered in this sample would increase take-up by only 2.6 percentage points, or 31 percent of the baseline take-up rate.

High rates depressed the *level* of take-up: Clients randomly assigned a higher-than-standard offer rate for their risk category were 3 percentage points (36 percent) less likely to apply (column 2).

The *slope* of the demand curve steepened in the region of higher rates (KINK): Take-up falls 1.7 percentage points for each 100-basis-point increase in the interest rate, on an average take-up rate

of 6.6 percent (column 3). Point estimates show that the price sensitivity of take-up was six times greater at higher-than-standard rates.

(c) The slope of the demand curve steepens in the region of higher rates (KINK). Discuss the three possible "KINK" explanations outlined in Karlan and Zinman (2008) and highlight the preferred explanation.

1. Selection based on discounting or rates of return.

Two problems:

- a) *lowering* the interest rate should affect only the intensive margin since everyone in the sample had already demonstrated a willingness to borrow at standard rates.

- b) potential borrowers vary over time with the severity of liquidity constraints and opportunity sets.

2. Consumers receiving high-rate offers borrowed elsewhere

3. Clients receiving high rates could wait for their deadlines to expire (two to six weeks hence) and then borrow at standard rates.

- Problem: If high-rate consumers wait, then they should be more likely to borrow after the high-rate offer expires. KZ find the opposite.

So clients may have substituted to informal lenders pre-deadline and then found it "costly" to switch back to the Lender post-deadline. (credit bureau info suggests that they did not change to other types of formal borrowing)