ECON4310 Ordinary Exam, Fall 2018

A.1 Ricardian Equivalence

Ricardian equivalence hypothesizes that forward-looking consumers internalize the government's budget constraint when making consumption decisions. This means that as long as the ultimate burden of financing lie entirely on these consumers, they are indifferent to taxes now or government debt (taxes later).

To prove this mathematically, show that the NPV of different financing schemes are the same. Here our candidate executed this perfectly, earning full-mark on all 3 questions.

Some students are put off by the 100% 30-year compound interest rate (<2.5% annually) and disfavours debt-financing, forgetting that this is the risk-free rate used for discounting, and any consumer savings put aside will also be doubled in nominal value after 30 years.

A1.1 Option c benefits Snorre because the war will be partly financed by future generations. Though our candidate did not specifically state this, his/her calculations – highest NPV with option c, fully explain why Snorre prefers c best and a, b are Ricardian equivalent.

A1.2 When private agents are credit-constraint, but the government is not, debt-financing can improve the welfare of private agents by helping them to smooth consumption.

A1.3 Now Snorre lives as long as the government and is "cursed" to forever pay back whatever the government owes in the form of future taxes. Hence he patiently saves what amounts to NPV 10K.

As a bonus, the candidate shows rigor by always be clear what she assumes.

A.2 Permanent Productivity Shocks in RBC

This true-or-false question has an unfortunate formulation: it is true that c0 increases by 10%, but not true that c0 increases more than c1, but the latter is not explicitly stated. This question is therefore not judged by "true" or "false" but for the argumentation for either case.

Here the candidate spots that the relative wage is unchanged, which leaves labour supply constant. A startling number of students deduce from increased wages and constant labour supply that consumption will also remain unchanged. That is incorrect. What are wage raises/productivity improvements good for if not for raising consumption or reduce labour?

However, it is true that relative consumption, pinned down by the Euler equation c1/c0=beta(1+r1), is constant. Thus it must be that c0 and c1 both increase by 10%, if the budget is to be used up. The candidate obtains full-mark on this one, but it would be even better had (s)he derived the Euler equation.

A.3 Heterogeneous workers

Just like in the previous question, Euler equation shows that both A and B have the same consumption slope c1/c0. The 10% higher earner B must have 10% higher consumption than A in both periods if he were to satisfy the budget constraint.

The candidate obtains full mark despite the first sentence being imprecise and incorrect. Later calculations show the candidate means to say that relative consumption c1/c0, not "% they save/borrow", is independent of income level. Saving and borrowing depends on optimal consumption allocation and distribution of income in different periods. Observation and proof of CRRA, as well as c0>c1, are both correct but irrelevant here.

B. Four-Period Model vs. OLG

B.1 Full mark

B.2 Full mark. Many students interpret "cannot borrow" as "cannot save either", which is incorrect both logically and realistically. My bank won't grant me a 10 million NOK loan, but is happy to take my 1000 NOK deposit.

B.3 6 / 10 points because the candidate solved the maximization problem of the children, but did not calculate V(b).

B.4 8 / 10 points because V(b) is not just log(c3) + log(c4), but the maximized value function of b.

B.5 Full mark granted with paragraph 1. The "realistic setting" part is amusing.

Caution to all candidates: if you answer a question correctly, but then add something wrong that contradict with some of your previous findings or arguments, the examiner may have sufficient grounds to doubt if you reached the right conclusion by luck, and deduct some points. Even if you add something correct, as this candidate did, it takes your precious time and does not improve your grade.

B.6 Full mark. Justification for such tax not necessary.

C. A Real Business Cycle Model

C.1 3 / 5 points. Expected wage not computed.

C.2 Full mark.

C.3 Full mark.

C.4 Full mark. Candidate saves time by leaving marginal utility functions unsolved, since the question asks for "optimality conditions", not "solutions". Some students insert a mistaken version of u(c) and lose points over it. Notice that we are given the marginal utility u'(c), not u(c).

C.5 Full mark.

C.6 Full mark. The candidate seems confident enough to deliberately waste time on "explaining the idea of the model", "not answering the question". Given our grading practice (A, B, C… instead of raw marks) this seems rational and optimal (by revealed preference), though not recommended. The candidate cannot get an A+, but has well-deserved his/her place on this comment session.

C.7 8 / 10 points. Full marks on inserting w=c into the Euler equation. Jensen's inequality is a strict one here because our agents are risk averse (u''<0), not risk neutral. We can see from the marginal utility function that the utility function is CRRA. The candidate seems unsure about this point and argues for both r<rNT and r=rNT. The candidate touches upon a risk-averse consumer's preference for insurance. From C.6 we know that nobody is insured, though everyone wants to be through precautionary saving. Thus the interest rate needs to be strictly lower than the risk-neutral rate, so low that nobody ends up saving anything (zero supply of a2), and the asset market clears.

Total mark is 150/160, a solid A. Congratulations!

General Remark on Exam Performance

Overall, candidates did well in part C, spent more time in part B than the examiners would expect, and struggled with the short questions, part A. Many students have limited understanding for Ricardian Equivalence, net present value, infinite horizon and how to use the Euler equation to determine optimal consumption path c1/c0.