UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 202A
Fall 2016
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FINAL EXAM

The exam consists of two parts. There are 98 points total. Part I has 38 points and Part II has 60 points.

You have 2 hours and 10 minutes.

A couple of notes:

- Some parts of the exam are harder than others. If you get stuck on one part, do the best you can without spending too much time, and then work on other parts of the exam.
- For the most part, I have tried to make the number of points on a problem roughly proportional to the amount of time I expect you to spend on it. The one exception is Problem 3 in Part II. On that problem, the points are low relative to the time you are likely to spend. (The reason is that the problem is somewhat "fuzzier" than the others and so may take longer, but I did not want it to have a huge weight in your score.)

PART I. Multiple choice and short answer (38 points)

A. Multiple choice (28 points)

In your blue book, give the best answer to 7 of the following 8 questions. Note:

– If you wish, you may add a BRIEF explanation of your answer to AT MOST ONE question. In that case, your grade on that question will be based on your answer and explanation together. This means that an explanation can either raise or lower a grade.

– If you answer all 8 questions, your overall score will be based on your average, not on your 7 best scores.

1. According to the permanent-income hypothesis, if a consumer learns in period t that their income will be temporarily higher in period $t + 1$, their consumption:

A. Rises permanently in period t.

B. Rises permanently in period $t + 1$.

C. Rises in period t, remains at that higher level in period $t + 1$, falls from that level in period $t + 2$, and does not change after that.

D. Does not change.

E. None of the above.

2. The following is a Bellman equation for an intertemporal consumption problem with uncertainty about labor income:

A. $V(A_t) = c_t + \beta A_t + e_t$.

B. $V(A_t) = E_t[\beta(1 + r)u'(A_t + y_t - c_t)]$.

C. $V'(A_t) = E_t[\beta u'(A_t + y_t - c_t)]$.

D. $V(A_t) = \max_{c_t} u(c_t) + \beta E_t[V((A_t - c_t)(1 + r) + y_{t+1})]$.

E. $V(A_t) = \max_{c_t} u(c_t) + \frac{1}{1+r} V((A_t - c_t) + y_{t+1})$.

3. Consider two consumers who maximize lifetime utility and who are not liquidity constrained. Consumer A's utility function, $u^A(\bullet)$, is quadratic, while Consumer B's utility function, $u^B(\bullet)$, satisfies $u^{B\prime}(\bullet) > 0$, $u^{B\prime\prime}(\bullet) < 0$, $u^{B\prime\prime\prime}(\bullet) > 0$. Then:

A. Consumer A will never go into debt, but Consumer B may.

B. Consumer B will never go into debt, but Consumer A may.

C. In response to an increase in uncertainty about future income, Consumer A's current consumption will not change, but Consumer B's will fall.

D. Consumer A will always have greater savings than Consumer B.

4. In the q-theory model of investment with kinked adjustment costs, an upward shift of the $\pi(\bullet)$ function:

A. Shifts the $\dot{q} = 0$ line up.

B. Shifts the $\dot{q} = 0$ region up.

C. Has no effect on the combinations of K and q such that $\dot{q} = 0$.

D. The impact on the combinations of K and q such that $\dot{q} = 0$ depends on where the economy is in (K,q) space at the time of the shift.

5. In the model of investment under uncertainty with costly state verification, the equilibrium contract is a debt contract because:

A. The outside investors are risk averse and the entrepreneur is risk neutral.

B. An equity contract would lead to adverse selection among entrepreneurs deciding whether to undertake their projects.

C. A debt contract minimizes agency costs.

D. All of the above.

6. In the Delong-Shleifer-Summers-Waldmann model, noise traders increase the volatility of the price of an asset by:

A. Increasing the variance of the demand for the asset, thereby causing fluctuations in its price.

B. Making the return on the asset riskier, thereby making the demand of rational traders for the asset less responsive to its price.

C. Increasing the variance of shocks to the fundamental value of the asset.

D. (A) and (B).

E. All of the above.

F. None of the above.

7. Two of the subsection titles in “What Explains the 2007-2009 Drop in Employment?” by Atif Mian and Amir Sufi are:

A. “Cosyndication and the Elasticity of Housing Supply” and “Sensitivity to the Sand States.”

B. “The Elasticity of Substitution between Goods Produced Locally and Elsewhere” and “Sensitivity to Measurement Error.”

C. “The Frisch Elasticity of Labor Supply” and “Implications for Fiscal Policy.”

D. “The Business Uncertainty Hypothesis” and “No Nominal or Real Rigidity.”

8. Auerbach and Gale's measure of the long-run fiscal imbalance, Δ, is the solution to:

A. $\int_{t=0}^{\infty} e^{-R^{PROJ}(t)} \left[\frac{\left(T^{PROJ}(t) - G^{PROJ}(t)\right)+\Delta}{G^{PROJ}(t)}\right] G^{PROJ}(t)dt = D(0).$

B. $\int_{t=0}^{\infty} e^{-R^{PROJ}(t)} \left[\frac{\left(T^{PROJ}(t) + G^{PROJ}(t)\right)+\Delta}{G^{PROJ}(t)}\right] G^{PROJ}(t)dt = D(0).$

C. $\int_{t=0}^{\infty} e^{-R^{PROJ}(t)} \left[\frac{T^{PROJ}(t) + G^{PROJ}(t)}{Y^{PROJ}(t)} + \Delta\right] Y^{PROJ}(t)dt = D(0).$

D. $\int_{t=0}^{\infty} e^{-R^{PROJ}(t)} \left[\frac{T^{PROJ}(t) - G^{PROJ}(t)}{Y^{PROJ}(t)} + \Delta\right] Y^{PROJ}(t)dt = D(0).$

B. Short answer (10 points)

ANSWER THE FOLLOWING QUESTION.

9. A researcher is interested in studying the impact of bank failures on economic activity. They are concerned about reverse causation, so they look at the relation between bank failures in period $t - 1$ and growth in period t. Specifically, they estimate, using OLS, the regression:

$$\Delta y_t = a + bF_{t-1} + e_t,$$

where Δy_t is the change in log real GDP from period $t - 1$ to period t and F_{t-1} is a measure of bank failures in period $t - 1$.

Is this regression a good way to get an estimate of the causal effect of bank failures on GDP? Explain your answer.

PART II. 60 points. DO ALL 3 PROBLEMS.

(20 points) 1. Consider the usual q-theory model. Suppose, however, that firms are taxed on their capital gains (and receive a payment from the government if they have capital losses). Letting τ $(0 < \tau < 1)$ denote the tax rate, the flow profits of a firm with quantity of capital $k(t)$ at time t are therefore $\pi\big(K(t)\big)k(t) - I(t) - C\big(I(t)\big) - \tau k(t)\dot{q}(t)$.

a. Explain, <u>either</u> intuitively <u>or</u> mathematically, why the equation of motion for q is $\dot{q}(t) = [rq(t) - \pi\big(K(t)\big)]/(1-\tau)$. (Note: A clear intuitive explanation is enough to get full credit.)

b. Explain, how, if at all, introducing the capital gains tax affects: the $\dot{K} = 0$ locus, the $\dot{q} = 0$ locus, and the saddle path.

c. Suppose there is a tax on capital gains but no payment from the government in the event of capital losses. What is the equation of motion for q in this case?

(20 points) 2. Consider a consumer who lives for two periods, 0 and 1. In period 0, the consumer has wealth of W, which they can allocate between two assets: a safe asset paying a real interest rate of 0 for sure, and a risky asset whose return is normally distributed with mean μ and variance V_r. The consumer's period-1 consumption is their labor income plus their wealth, $C = Y + S + (1 + r)X$, where Y is their labor income, S is their holdings of the safe asset, X is their holdings of the risky asset, and r is the realization of the return on the risky asset.

Importantly, Y is random and potentially correlated with the return on the risky asset. Y is normally distributed with mean $\bar{Y}$ and variance V_Y, and the covariance between the return on the risky asset and Y is σ_{rY}. The consumer seeks to maximizes the expected value of period-1 utility, which takes the constant absolute risk aversion form, $U = -e^{-2\gamma C}$.

a. Use the budget constraint, $S + X = W$, to express expected utility as a function of the consumer's choice of X and the parameters of the model (W, μ, γ, and so on). (A potentially useful fact: If a variable a is distributed normally with mean m and variance q, then $\mathrm{E}[e^a] = e^{m+(q/2)}$.)

b. What is the derivative of expected utility with respect to X at $X = 0$? If $\mu > 0$, does expected utility necessarily increase if the consumer goes from holding none of the risky asset to holding a small positive amount? Explain why or why not.

c. Find the value of X that maximizes the consumer's expected utility.

(20 points) 3. This problem asks you to sketch how you would go about analyzing a variant of the Diamond-Dybvig model. **(Note: The problem does NOT ask you to solve the model. You will receive no extra credit for doing more than the problem asks you to do.)**

Consider the usual Diamond-Dybvig model. The key difference is that θ – the fraction of agents who learn in period 1 that they are type a – is random. It can take on two values, θ_L and θ_H ($0 < \theta_L < \theta_H < 1$), each with probability one-half. The realization of θ is not observable.

The other assumptions are the same. Briefly: Agents live for 3 periods. Ex ante, they are identical. Those who turn out to be type a have utility $\ln c_1^a$, and those who turn out to be type b have utility $U^b = \rho \ln(c_1^b + c_2^b)$, $0 < \rho < 1$. Each agent is endowed with 1 unit of the economy's good in period 0. The unit yields 1 unit if it is consumed in period 1, and $R > 1$ units if it is consumed in period 2. The model assumes $\rho R > 1$.

a. Sketch how you would find the first-best, full-information allocation (that is, the consumption of each type of agent in each period as a function of θ if individuals' types and the realization of θ were observable).

b. Consider a bank as in the standard Diamond-Dybvig model. The bank offers a contract of the following form. If an individual deposits their endowment with the bank, they can withdraw some amount X in period 1; in period 2, the bank's remaining assets are divided equally among all depositors who did not withdraw in period 1. If the bank does not have enough resources to pay X to everyone who wants to withdraw in period 1, a subset of the early withdrawers, chosen at random, get X so that the bank's resources are exhausted, and the remaining depositors get nothing.

Explain why if fraction f of depositors withdraw in period 1, the amount each depositor who waits until period 2 receives is $\max\{(1 - fX)R/(1 - f), 0\}$.

c. What condition must X satisfy for it to be a Nash equilibrium for the type a's, and only the type a's, to always withdraw in period 1? For simplicity, call this a "good Nash equilibrium".

d. Assume that if a good Nash equilibrium exists, then it is the outcome. Set up, but do not solve, the problem of finding the best good Nash equilibrium – that is, the value of X for which the good Nash equilibrium gives the highest expected utility of the representative agent before they know their type or the realization of θ.

e. Suppose you wanted to analyze the question of whether for some value of X where there is a good Nash equilibrium, a bank run is also a Nash equilibrium. Sketch how you would go about doing that.

f. Suppose you wanted to analyze the question of whether there is some value of X for which there is a good Nash equilibrium and that equilibrium achieves the first-best allocation discussed in part (a). Sketch how you would go about doing that.