UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 202A
Fall 2018
D. Romer

Problem Set 12
Due in lecture Thursday, December 6

1. Romer, Problem 10.12.

(From an old final.) 2. In the Diamond-Dybvig model, the key departure from Walrasian assumptions is:

A. Asymmetric information between entrepreneurs and outside investors.
B. The presence of noise traders.
C. Preference shocks.
D. The lack of observability of agents' types.

(From the Fall 2016 final.) 3. 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.

(Based on a problem on the Fall 2016 final.) 4. 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 "Supply-Side Sector-Specific Shocks."

EXTRA PROBLEMS (NOT TO BE HANDED IN; COMPLETE ANSWERS MAY NOT BE PROVIDED)

5–8. Romer, Problems 10.7, 10.8, 10.9, and 10.11. (Note: in part (a) of Problem 10.11, "c_1^{b*}" should be "c_2^{b*}".)

(From the Fall 2016 final.) 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.

10. (This follows Jacklin, 1987.) Consider the Diamond-Dybvig model as presented in lecture and in the reading. But suppose that instead of a bank, there is a firm. The firm obtains S units of the economy's endowment by selling S shares in period 0 (the price of a share in units of period 0 endowment is 1). The firm's business plan (to which it is committed) is to invest the S units; pay a dividend of D_1 per share in period 1 (by liquidating fraction D_1 of its investment); and then pay a dividend of D_2 per share in period 2 that leaves it with no remaining assets.

a. Explain why $D_2 = R(1 – D_1)$.

b. Suppose all agents use their endowment to buy shares in the firm, and suppose there is a market for shares in the firm in period 1 after D_1 has been paid. If all type a agents sell their shares and all type b agents use all of their period 1 dividends to buy shares, what will the price of shares, P, be as a function of D_1 and θ?

c. Continue to assume that all type a agents sell their shares and all type b agents use all of their period 1 dividends to buy shares. What will be the consumption of type a agents in period 1? The consumption of type b agents in period 2?

d. Is there a value of D_1 that yields the social optimum? Explain. (Recall that the social optimum is for the type a agents to consume $1/[\theta + (1 – \theta)\rho]$ in period 1 and for the type b's to consume $\rho R/[\theta + (1 – \theta)\rho]$ in period b.)

e. For what values of P will the type a agents want to sell their shares (or be indifferent)? For what values of P will the type b agents want to buy shares (or be indifferent)? With D_1 equal to the value you found in part (d), are these conditions satisfied?

f. Is this equilibrium vulnerable to a run? Explain.

(From the Fall 2016 final.) 11. This problem asks you to sketch how you would go about analyzing a variant of the Diamond-Dybvig model. **(Note: The problem does <u>NOT</u> 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.