EC721B FINAL EXAMINATION SOLUTIONS, FALL 2018

1. *(5*5=25 marks) Do you agree, disagree either fully or partially with the following statements? Briefly (in a few sentences and/or short model sketch/citations) explain the reasoning underlying your position.*

(a) Loans with high collateral should be associated with lower interest rates.

Agree. Posting high collateral allows a borrower to signal low project risk in an adverse selection context (if p is probability of project success/loan repayment, expected payoff of the borrower with wealth W for a loan with repayment obligation R, collateral C and project return Y is $pU(W+Y-R)+(1-p)U(W-C)$, so the marginal rate of substitution between R, C is $\frac{(1-p)U'(W-C)}{pU'(W+Y-R)}$ which is falling in p). Alternatively in a moral hazard setting, the borrower would have more to lose in the event of defaulting on the loan, thereby lowering default risk, i.e., the lender's expected cost of lending; hence with competition on the credit market the interest rate should be lower.

(b) In the presence of credit constraints, small farms will be less productive than large farms.

This can happen, but need not. It can happen if small farmers are unable to borrow to finance capital equipment or high quality/price seeds which enhance productivity. If instead (as in the Eswaran-Kotwal model) there are agency problems on the labor market and large/small farmers have equal endowments of labor, small farms would rely on family labor while large farms would rely more on hired labor who have to be supervised and are less productive than family labor. In that case large farms would end up being less productive.

(c) If in a sector firm i has production function $Y_i = A_i K_i^{\alpha}$ where $\alpha \in (0,1)$, and faces product price p_i, misallocation in the sector can be measured by the dispersion of average revenue product $\frac{p_i Y_i}{K_i}$ across firms.

Agree. Let $(1+t_i)r$ denote the cost of capital faced by firm i where t_i is the capital wedge, the firm will select capital so that $(1+t_i)r = p_i \frac{\partial Y_i}{\partial K_i} = p_i \alpha \frac{Y_i}{K_i}$, so the dispersion of average revenue product is proportional to the dispersion of the capital wedge.

(d) The Coate-Ravallion model explains why informal networks are particularly effective in supporting mutual insurance against large covariate risks.

Disagree. In states with large covariate risks, the Coate-Ravallion model predicts informal insurance tends to break down, because the utility sacrifice to the insurer becomes progressively larger.

(e) Divergence of pre-election policy platforms of competing candidates is inconsistent with the Downsian assumption that they can commit to these platforms.

Disagree. A Downsian model with pre-election commitments can generate equilibrium policy divergence either if they have divergent policy preferences of their own, or if there are special interest groups as in the Grossman-Helpman model and one of the two parties is more likely to win in the absence of any campaign contributions.

2. *A rural economy has three types of agents: landless (owning* 0 *land), small (owing 1 unit of land each) and big (owning* $k > 2$ *units of land each), in proportions* $\lambda_0 (= 1 - \lambda_1 - \lambda_k), \lambda_1, \lambda_k$ *where the total amount of land* $L = \lambda_1 + k\lambda_k$ *is given. Assume that there are enough landless relative to big agents in the sense that* $\lambda_0 > (k-1)\lambda_k$*.*

An agent earns an income $y(l)$ *from owning* l *units of land, where the function* $y(.)$ *is strictly increasing and strictly concave. All agents share the same strictly increasing, strictly concave, smooth utility function* u *defined over their own income.*

The government chooses a policy of land reform, defined by $r \in [0, k-1]$*, wherein it takes away* r *units of land from each big agent, selects* $r.\lambda_k$ *landless agents randomly from the set of all landless and gives then one unit of land each.*

(a) (3 marks) Derive payoffs of each type as a function of the land reform policy r*.*

$$U_L(r) \equiv \frac{r\lambda_k}{\lambda_0} u(y(1)) + [1 - \frac{r\lambda_k}{\lambda_0}] u(y(0))$$

$$U_S \equiv u(y(1))$$

$$U_B(r) \equiv u(y(k-r))$$

(b) (7 marks) What is the utilitarian welfare optimal land reform policy r_W?

r_W maximizes

$$W(r) \equiv \lambda_0 U_L(r) + \lambda_1 U_S + \lambda_k U_B(r)$$

subject to $r \in [0, k-1]$, and the objective function is strictly concave. So the optimal policy r_W is characterized by FOC:

$$W'(r_W) = \lambda_k \{[u(y(1)) - u(y(0))] - u'(y(k - r_W)) y'(k - r_W) = 0$$

if r_W is interior, and corresponding inequalities otherwise. Now define $g(r) \equiv u(y(r))$ which is strictly concave. Note that $k - r \geq 1$ implies $W'(r)$ is proportional to $[g(1) - g(0)] - g'(k - r) \geq [g(1) - g(0)] - g'(1) > 0$ by the Mean Value Theorem. Hence $W'(r) > 0$ for all $r \in [0, k-1]$ and $r_W = k - 1$.

(c) (5 marks) There are two parties A, B competing to win an election. Each party commits to a land reform policy in advance of the election. The fraction of landless and small agents that are informed voters are α_0, α_1 respectively, where $0 < \alpha_0 < \alpha_1 < 1$. All big agents are informed voters. An informed voter of type i with payoff function $W_i(r)$ chooses party A if $W_i(r_A) + \epsilon > W_i(r_B)$, where ϵ is an iid uniform voter-specific loyalty shock with constant density f and zero mean. An uninformed voter chooses party A if $\epsilon > 0$. The probability that party A wins is increasing in its vote share. Show that both parties have a dominant strategy of selecting the same (Downsian) policy r_D. Compare r_D with the utilitarian welfare optimal policy r_W. Does r_D depend on the land distribution (e.g., represented by the fraction of small landowners λ_1)?

Both parties will want to maximize the same objective function:

$$D(r) \equiv \lambda_0 \alpha_0 U_L(r) + \lambda_1 \alpha_1 U_S + \lambda_k U_B(r)$$

so

$$D'(r) = \lambda_k\{\alpha_0[u(y(1)) - u(y(0))] - u'(y(k-r))y'(k-r)\}$$

implying that $D'(r) < W'(r)$ and $r_D < r_W$ for α_0 sufficiently small. As r_D is characterized by $\alpha_0[u(y(1)) - u(y(0))] - u'(y(k-r))y'(k-r_D) = 0$ for an interior solution, it does not depend on the land distribution.

(d) (7 marks) Now suppose the big agents can form a lobby and make campaign contributions (in the form of time spent mobilizing and persuading voters to vote for a given party) to the two parties, as in the Grossman-Helpman model. Assume that the payoff of a big agent equals $u(y(k-r)) - \frac{C_A+C_B}{\lambda_k}$, where C_A and C_B denote (aggregate time) contributions of the lobby to the two parties respectively (divided equally among all members of the lobby). Uninformed voters vote for party A if $h[C_A - C_B] + \epsilon > 0$ where $h > 0$ is a given parameter. Informed voters are not affected by party campaigns. Characterize the resulting equilibrium policy r_L (making the same assumptions as in the Grossman-Helpman model, that only the influence motive operates). Compare this with r_D and r_W.

Now both parties will want to maximize

$$L(r) \equiv \lambda_0\alpha_0 U_L(r) + \lambda_1\alpha_1 U_S + [\lambda_k + \frac{\chi}{2}]U_B(r)$$

where χ equals the product of h and the proportion of uninformed voters $[\lambda_0(1-\alpha_0) + \lambda_1(1-\alpha_1)]$, so the big landowners get an added implicit welfare weight of $\frac{\chi}{2}$. Hence r_L solves the first order condition $L'(r_L) = 0$ where

$$L'(r) = \lambda_k\{\alpha_0[u(y(1)) - u(y(0))] - u'(y(k-r))y'(k-r)\} - \frac{\chi}{2}u'(y(k-r))y'(k-r) \quad (*)$$

which implies $r_L < r_D < r_W$ if r_D is interior.

(e) (3 marks) Does r_L depend on the land distribution? How? Do you think a dynamic extension of this model might be interesting?

Yes it depends on the land distribution (thru dependence of $L'(.)$ on λ_k directly and through dependence of χ on the land distribution. An increase in λ_k (proportion of large landowners) raises the direct (populist) returns from land reform (the first term on the

RHS of (*)), while also raising the resistance to land reform (by raising the welfare weight χ of big landowners). This suggests a dynamic extension where land distribution at date t affects land reform at date t which results in a new land distribution at $t+1$, and so on...