Homework 5

(Experimental Economics: Spring 2019)

Consider the voter participation model. There are two alternatives, a, b. There are two groups L, M; the number of group L members is l and that of group M members is m, where $0 < l < m$. All those in group L strictly prefer a to b and all those in group M strictly prefer b to a. In particular, for all $i \in L$, $u_i(a) = H$, $u_i(b) = L$, and for all $j \in M$, $u_j(a) = L$, $u_j(b) = H$, where $H > L > 0$. The cost of voting is now a uniformly distributed random variable on the support $[0, 1]$. One's voting cost is a private information, so one only knows his own (realized) voting cost, but not other members'. Individuals choose to vote either a or b, or abstain. The election is decided by plurality rule with ties broken by a fair coin toss.

(a) A quasi-symmetric equilibrium is characterized by a pair of threshold costs (c_L^*, c_M^*), hence members in group k participate in voting (and vote for their preferred alternative) if and only if their voting cost c is less than c_k^*, for $k \in \{L, M\}$. The threshold costs then decide the equilibrium participation rates (p_L^*, p_M^*), and actually, $(c_L^*, c_M^*) = (p_L^*, p_M^*)$ with the uniformly distributed cost on $[0, 1]$. Using these threshold costs/participation rates and binomial formula, write down the expressions for the pivot probabilities for a, b, $\Pr[Piv_a|l, m]$ and $\Pr[Piv_b|l, m]$.

(b) Using the expressions for the pivot probabilities, write down the two indifference conditions, one for each group $k \in \{L, M\}$, implying that the threshold cost type c_k^* is indifferent between voting and abstaining.

(c) The two indifference conditions in part (b) give us two equations in two unknowns which we now write $p_k^*(l, m)$, $k \in \{L, M\}$ to indicate the dependence of our solutions on group sizes. Assume $H = 105$, $L = 5$. Show by computation that $p_L^*(2, 3) > p_L^*(4, 5)$ and $p_M^*(2, 3) > p_M^*(4, 5)$. That is, the participation rates are decreasing in total group size while the election remains "close" (size effect).

(d) Also show by computation that $p_L^*(4, 5) > p_L^*(3, 6)$ and $p_M^*(4, 5) > p_M^*(3, 6)$. That is, the participation rates are higher when the election is "close" than when it is a "landslide" (competition effect).

(e) Finally, verify from the results in parts (c), (d) that $p_L^*(2, 3) > p_M^*(2, 3)$, $p_L^*(4, 5) > p_M^*(4, 5)$ and $p_L^*(3, 6) > p_M^*(3, 6)$. That is, the participation rates for the minority group L are higher than those for the majority group M (underdog effect).