(1) \[
\max_{CP=CC^P_B, CC^P_G} \left[ \Pi_L (m_B - C^P_B) + (1-\Pi_L) (m_G - C^P_G) \right] + (1-x) [\Pi_H (m_B - C^P_B) + (1-\Pi_H) (m_G - C^P_G)]
\]

S.T.
IR_L: \[\Pi_L U(C^P_B) + (1-\Pi_L) U(C^P_G) \geq \Pi_L U(m_B) + (1-\Pi_L) U(m_G)\]
IR_H: \[\Pi_H U(C^P_B) + (1-\Pi_H) U(C^P_G) \geq \Pi_H U(m_B) + (1-\Pi_H) U(m_G)\]

IC_L, IC_R are irrelevant because we are pooling \[\Pi_H > \Pi_L\]

IR_L: \[\Pi_L (U(C^P_B) - U(m_B)) \geq (1-\Pi_L) (U(m_G) - U(C^P_G))\]
IR_H: \[\Pi_H (U(C^P_B) - U(m_B)) \geq (1-\Pi_H) (U(m_G) - U(C^P_G))\]

(a) There will never be a pooling. Loop.
(b) Sometimes it will be profitable
to some only give high type

For a formal argument see: (Available on Jstor)
"Monopoly, Non-linear Pricing and Imperfections: The Insurance market" J. E. Stiglitz

Note: \[m_B = w_0 - \delta\]
\[m_G = w_0\]
\[C_B = w_0 - \delta + B\]
\[C_G = w_0 - x\]
(Property 3 and 4)
2.1 This result follows from the competitive structure, and the fact that there are only 2 types.

Suppose the 2 firms offer different contracts => one firm would always capture the workers => the other firm would have incentive to deviate to the other contracts, so they must offer the same contracts.

Suppose each firm offers 2 contracts; intuitively one contract will never be chosen => it is irrelevant and should not be offered.

2.2 There is no pooling equilibrium because if one employer tried to offer a pooling wage, the other employer could successfully target the high type by offering a slightly higher wage.

2.3 Suppose 1 firm is earning a positive profit, the other firm would be able to steal the workers by offering a slightly higher wage. This will occur until \( w_1 = w_2 \), and wage cannot be raised any higher.
\[ \begin{align*}
\sum (z_{m-o}) (e_{m-w}) + \sum (q_{m-e}) (v_{m}) &= 0 \\
& \quad \text{(2m-o)} v + (m-w) k-x \\
\end{align*} \]
\[ E[\Pi] = \Pr(b_i > b_{-i}) \cdot E[b_{-i} \mid bi > b_{-i}] \]

\[ = \int ... \int \int (\Theta_i - b_i) d\Theta_1 d\Theta_2 ... d\Theta_n \]

\[ = (\Theta_i - b_i) \cdot B^{-1}(b_i)^{n-1} \]

**Guess:**

\[ b_i = \bar{x} + \eta \Theta_i \]

\[ \frac{b_i - \bar{x}}{\eta} = \Theta_i = B^{-1}(b_i) \]

\[ \Pi = (\Theta_i - b_i) \left( \frac{b_i - \bar{x}}{n} \right)^{n-1} \]

\[ \max_{b_i} (\Theta_i - b_i) \left( \frac{b_i - \bar{x}}{n} \right)^{n-1} \]

\[ \lambda(b) = -\left( \frac{b_i - \bar{x}}{n} \right)^{n-1} + (\Theta_i - b_i) \left( \frac{n-1}{n} \right) \left( \frac{b_i - \bar{x}}{n} \right)^{n-2} = 0 \]

\[ \left( \Theta_i - b_i \right) \frac{n-1}{n} \left( \frac{b_i - \bar{x}}{n} \right)^{n-2} = \left( \frac{b_i - \bar{x}}{n} \right)^{n-1} \]

\[ \left( \Theta_i - b_i \right) \frac{n-1}{n} = \frac{b_i - \bar{x}}{n} \]
\[ \Theta_i(n-1) - b_i n + b_i = b_i - x \]
\[ b_i n = \Theta_i(n-1) + x \]
\[ b_i = \Theta_i \left( \frac{n-1}{n} \right) + \frac{x}{n} \]

From our guess
\[ b_i = n \Theta_i + x \]
\[ \Rightarrow n = \left( \frac{n-1}{n} \right) \]
\[ \Rightarrow x = \frac{x}{n} \quad x \left( 1 - \frac{1}{n} \right) = 0 \]
\[ x = 0 \]

\[ b_i(\Theta_i) = \left( \frac{n-1}{n} \right) \Theta_i \]

Bayesian Nash:
\[ b_i(\Theta_i) = \left( \frac{n-1}{n} \right) \Theta_i \forall i \]
Mechanism:
- Each player is asked to reveal their valuation.
- The one with the highest is charged 

\[ \left( \frac{n-1}{n} \right) \text{Valuation} \]

Issue: will an agent want to lie?

- Suppose they over-report, then they have positive prob. of getting negative utility.

- Suppose they under-report, then they may lose, whereas they should have won, and get lower positive utility.

=> Best - Response is to truthfully report your valuation.
see pg. 148-153 of "The Theory of Industrial Organization: A Study of the Conditions for a Full Treatment of This Subject"

Rise in the correlation to street...