Economics 220, January 2022 **Your Name:** Dhyey Dharmendrakumar Mavani

Homework 14

1. A government agency employs an worker with skilled knowledge of building methods as a building inspector to ensure that all new buildings are constructed "to code" (ie., meet legal standards). If they were not working for the government, the worker could earn a monthly wage of $2,000 working for a construction firm.

   Each month that they work as an inspector, the worker has an opportunity to take a bribe of $2,700 to certify substandard work as being up to code. However, they know that if they do so, there is a 20% chance that this will be detected (for example, because the building may fall down if not constructed properly). If bribery or other malfeasance is detected, the worker will be fired from their job, but there is no other penalty (the corruption would be too hard to prove, or too embarrassing to publicize with a trial). The employee's monthly discount rate is $\delta = 0.9$.

   What wage must the agency pay the worker to ensure that they will not accept bribes?

Payoff to honest behavior = $w^*\left(\frac{1}{1-\delta}\right)$

Payoff for dishonesty = $w^* + b + p\left(\frac{\delta w^0}{1-\delta}\right) + (1-p)\left(\frac{\delta}{1-\delta}\right) w^*$

$\delta = 0.9$
$p = 0.2$
$b = 2700$
$w^0 = 2000$

$\Rightarrow$ for making honest behavior dominant,

Payoff to honesty > Payoff for dishonesty

$$\Rightarrow \quad w^* \geqslant w^0 + \frac{b(1-\delta)}{\delta p} \quad \Rightarrow \quad w^* \geqslant 2000 + \frac{\cancel{2700}^{\cancel{300}\ 1500}(\cancel{0.1})}{(\cancel{0.9})(\cancel{0.2})}$$

$$\Rightarrow \boxed{w^* \geqslant 3500} \text{ Ans}$$

Hence, agency should pay the worker at least the efficiency wage which in this case is $3500.

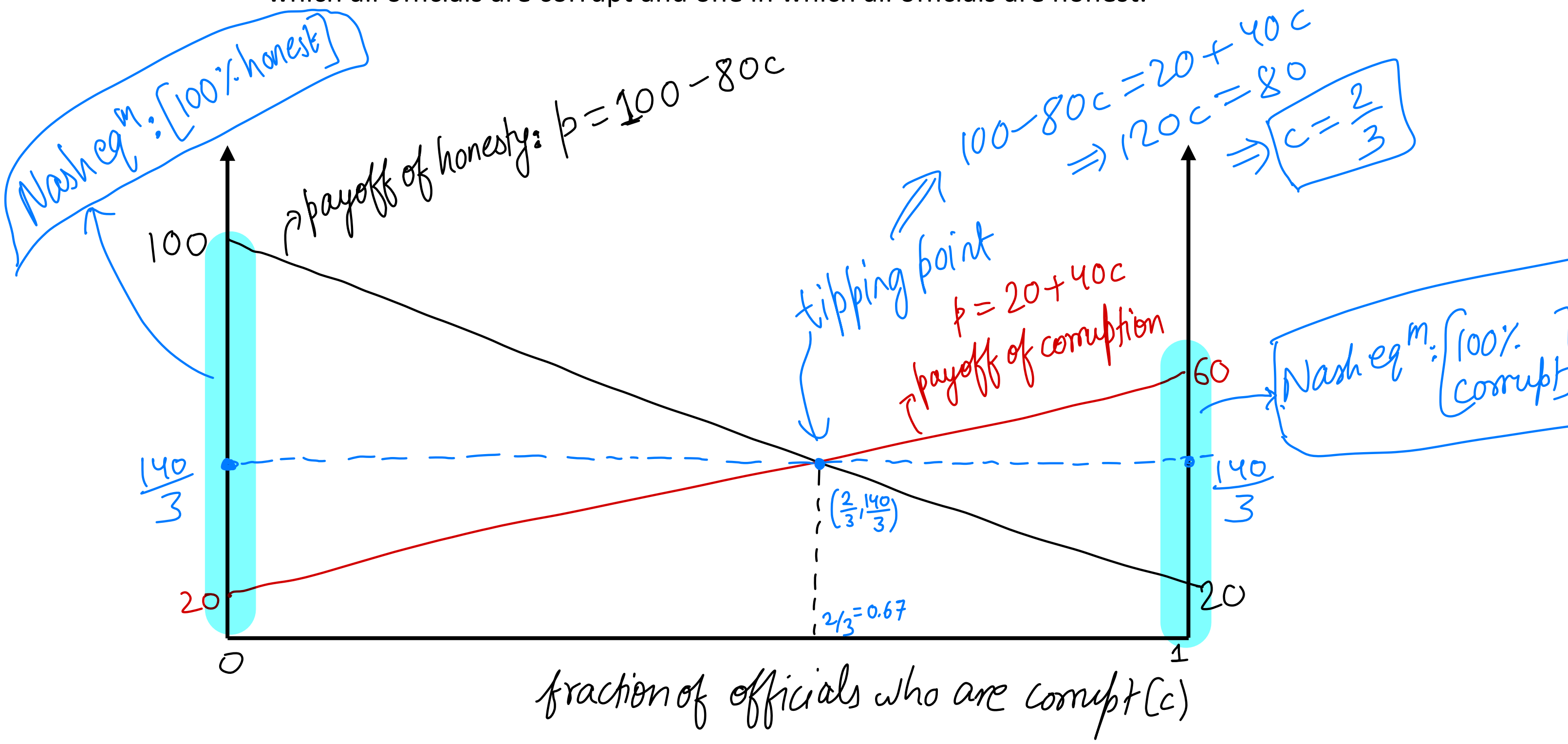
efficiency wage $\leftarrow$ $\boxed{w^* \geq w^0 + \frac{b(1-\delta)}{\delta p}}$

Intuitively, how would this 'efficiency' wage be affected (would it rise or fall) if:

INTUITIONS	CALCULATIONS
As probability of detection rose, they would be less likely to be corrupt and thus we need to provide less efficiency wage for incentivizing people to remain corruption-free	**The probability of detection rose from 20% to 25%?** If probability rises then w* (efficiency wage) will fall. $w^*_{new} \geq 2000 + \frac{\cancel{2700}\,\cancel{(0.1)}\ \cancel{300}\ 1200}{\cancel{(0.9)}\,\cancel{(0.25)}} = 3200$ $\Rightarrow$ The new efficiency wage would be (\$3200) which is (\$300) less than the intial eff. wage of (\$3500)
If bribe amount rises the we would need to increase the efficiency wage because there will be more incentive amongst people to do corruption overall.	**The bribe amount rose from \$2,700 to \$3,000?** If bribe amount rises then w*(efficiency wage) will rise. $w^*_{new} \geq 2000 + \frac{3000\,\cancel{(0.1)}}{\cancel{(0.9)}(0.2)} = 2000 + \frac{\cancel{15000}\ 5000}{\cancel{9}\ 3} = \frac{11}{3}\times 10^3 \approx 3666.67$ $\Rightarrow$ The new efficiency wage would be (\$3666.67) which is (\$166.67) more than the intial eff. wage of (\$3500).
If the discount rate rises then people would be more fearful to lose more money and hence we would need less of an efficiency wage because there is a lesser incentive among people to do corruption.	**The discount rate rose from 0.9 to 0.95?** If discount rate rises, then w*(efficiency wage) will fall. $w^*_{new} \geq 2000 + \frac{(2700)\,\cancel{(0.05)}}{19\ \cancel{(0.95)}(0.2)} = 2000 + \frac{2700}{3.8} \approx 2710$ $\Rightarrow$ The new efficiency wage would be around \$2710 which is around \$790 less than the intial eff. wage of (\$3500)
If people have a stronger or more paying outside option then it intuitively makes sense that they would have more incentive to take bribe as they now don't care about losing their current job as much as before. Hence, we would have to increase the efficiency wage if we want to ensure that people should prefer honesty policy over doing corruption.	**The worker's outside option rose from \$2,000 to \$2,500?** The worker's outside option rises, then w*(efficiency wage) will rise. $w^*_{new} \geq 2500 + \frac{\cancel{(2700)}^{300}\,\cancel{(0.1)}\ 1500}{\cancel{9}\cancel{(0.9)}\,\cancel{(0.2)}} = 4000$ $\Rightarrow$ The new efficiency wage would be (\$4000) which is (\$500) more than the intial eff. wage of (\$3500)

2. Consider a government agency with officials who choose between two possible strategies: honesty or corruption. The payoff to honesty is 100 – 80c where c is the fraction of officials who are corrupt. The payoff to corruption is 20 + 40c.

Sketch these payoffs as a function of c, and identify the Nash equilibria and the 'tipping point' value of c that needs to be crossed in order to switch between an equilibrium in which all officials are corrupt and one in which all officials are honest.



Suppose the government observes widespread corruption, and decides to attempt a crackdown to bring about a permanent shift in officials' behavior. The crackdown would reduce the payoff to corruption to 20 + 40c – P, where P is an additional expected punishment for corruption imposed on corrupt officials. How large would P have to be to bring about the desired lasting change in behavior?

In order to bring the lasting change in the behavior, we should impose a P such that it brings the "payoff of corruption" curve (red curve in the above diagram) down such that its y-intercept at c=1 is less than 20. $\Rightarrow$ $20+40c-P \leq 20$ at $c=1$

$\Rightarrow \boxed{P \geq 40}$.