Assignment 2: Suggested Solutions

1 [Big Push]

a. A plausible result from opening the economy to trade is to increase demand for goods. If the demand is sufficiently large enough to offset the cost of modernization, the entrepreneurs in the economy will choose to modernize. Hence, the economy modernizes. To have this scenario, the trading partner country must be richer than our original economy, so that the average demand faced by each firm is higher.

b. There are many coordination failures in the world. The two requirements for being a coordination failure are that, first, there must be at least two equilibria, in which one equilibrium is arguably argued superior to the other. And, second, lack of communication or/and coordination result in the inferior equilibrium. We can find a lot of coordination failure in social interaction. For example, peer pressures are always a classic example. If they can coordinate actions before hands, each of them would come out superior.

2 [O-Ring]
a. The production patterns of firms B and D must be $q_L q_L = 0.16$ and $q_H q_L = 0.28$.
I will assume that firm B does the former and firm D does the latter.
b. Profits for firms A and B are 0. Profits for firms C and D are -0.045.
c. The current aggregate output is = 0.49 + 0.16 + 0.28 + 0.28 = 1.21. The economy can improve by using skill-clustering pattern of production, yielding an aggregate output of 1.3.
d. With new q_H, the wage for the high skilled worker is 0.32, while the wage of for the unskilled is the same at 0.08, putting the wage differential at 0.24. The original wage differential was at 0.165. Thus inequality has gone up by 0.075. The increase in quality of 0.1 leads to increases in inequality of 0.075. The higher the original high quality, the faster the differential spreads.

3 [Lewis Model]
a. "Unlimited Supplies of Labor" are crucial for the Lewis' idea of process of development. Industrial sector needs a pool of labor ready to leave the agricultural sector, because that sector is already too crowded, hence its stagnation and falling average productivity. This way, industrial sector can expand for some times without reaching the equilibrium yet.

b. This fact *can be* reconciled with the model. Although Lewis' story focuses on the industrial expansion, nothing prevents the model from having *an improvement in agricultural technology and productivity* so that the sector too could expand. This seems to be the case for Australia in which advancement in agricultural technologies have improved the productivity, and lifting the wage of agricultural sector.

4 [Harrod-Domar] $s = 0.2$ and $k = {}^{K}/_{Y} = 4$.
a. The growth rate of the economy is $g = {}^{s}/_{k} = {}^{0.2}/_{4} = 0.05 = 5\%$.
b. If Y = 200, aggregate consumption next year (0.8)*(1.05)*200 = (0.8)*(210)=168. That is, the marginal propensity to consume of 0.8 and growth rate of Y of 5% enter in the calculation.
c. If Y = 200, then K = 800. Japanese investment brings capital up to 1200, making the new capital-output ratio equals $k = 6$. The new growth rate is at 3.3%.

d. With new capital, *in equilibrium* the demand side will be:

$S = I = \Delta K = 0.05 \times 1200 = 60.$

C + S = cY + S = c (200) + 60 = 200 So c = 0.7 or saving rate is 0.3

They must consume less and save more. In particular, they must save more by 0.1, so the saving rate must be 0.3.

5 [Harrod-Domar]

Harrod-Domar paradigm fails to capture to the dynamic tradeoffs between today and tomorrow. Consumption decision today is taken from what you could consume tomorrow, i.e. saving. Consumption indeed helps fuel short-run growth, but without saving and investment, the economic growth cannot sustain. Nonetheless, the model is still useful enough for an approximation of the East Asian growth process during the 1990's in which saving rates were extraordinarily high, providing the economy with funds for further investment. Yet, due to the linear relationship of saving rate and growth rate, it cannot capture fully the cost-benefit analysis of consumption and saving. Saving too much is not good, while consuming too much is not good either. A more complete growth theory must find an optimal balance between the two. We'll see examples of that later on in the class.

Extra Credit

Although we have seen this in the numerical exercise above (I hope you have), we can demonstrate the point more generally. We wish to show that the profit of mixed-skill firms is lower than the skill-clustered firms (which we know it is zero), in equilibrium. Output for the mixed-skill firms is $q_H q_L$. Since labor market is competitive, all firms are price takers so they pay wage for the same worker. Recall that wages, *in equilibrium*, are given by $\frac{1}{2}q_H^2$ and $\frac{1}{2}q_L^2$ for high- and low-skill, respectively. The profit of the mixed-skill firms are:

$$q_H q_L - \tfrac{1}{2}q_H^2 - \tfrac{1}{2}q_L^2 = \tfrac{1}{2}\left(2q_H q_L - q_H^2 - q_L^2\right) = -\tfrac{1}{2}\left(q_H^2 + q_L^2 - 2q_H q_L\right) = -\tfrac{1}{2}\left(q_H - q_L\right)^2 < 0.$$

So mixed-skill firms always earn negative profit, which is lower than the skill-clustered firms who earn zero profit.