# Homework 4 (46 Points)

## Problem 1 (6 Points)

In his famous soliloquy, Hamlet ponders whether to continue to live or die:

> "To be, or not to be, that is the question / Whether 'tis nobler in the mind to suffer / The slings and arrows of outrageous fortune / Or to take arms against a sea of troubles / And by opposing end them. To die—to sleep / No more; and by a sleep to say we end / The heart-ache and the thousand natural shocks / That flesh is heir to: 'tis a consummation / Devoutly to be wish'd. To die, to sleep / To sleep, perchance to dream—ay, there's the rub / For in that sleep of death what dreams may come / When we have shuffled off this mortal coil / Must give us pause—there's the respect / That makes calamity of so long life" – *Hamlet* (3.1.55–68)

Sir Laurence Olivier in *Hamlet* (1948)

Suppose to Hamlet, the "benefit" of continuing living is $-100$ ("*to suffer, the slings and arrows of outrageous fortune*"), while the "benefit" of death is uncertain: with 50% probability, death brings eternal peaceful sleep ("*to die, to sleep*"), which Hamlet values at 100, but with 50% probability, death brings eternal nightmare ("*in that sleep of death what dreams may come ... must give us pause*"), which is even worse than living and which Hamlet values at $-200$.

1. Calculate the opportunity cost of continuing living for Hamlet (You can treat the "benefit" of living as either a negative benefit or a positive direct cost). (2 Points)

   `Benefit:` $-100$`, Opportunity cost:` $-50$
   `or, Benefit:` $0$`, Opportunity cost:` $50$

2. According to this calculation, if Hamlet is rational, should he choose "to be" or "not to be"? (2 Points)

   `Not to be`

3. If Hamlet chooses to die, Ophelia will be devastated. In other words, Hamlet's death will affect not only himself, but people around him. This is called **negative externality** ("negative" because Ophelia will be sad). Many people question whether Hamlet actually loved Ophelia, but he did write the following poem to her:

   > "Doubt thou the stars are fire,
   > Doubt that the sun doth move,
   > Doubt truth to be a liar,
   > But never doubt I love." – *Hamlet* (2.2.116–119)

   So let's suppose Hamlet does care about Ophelia and he values Ophelias's sadness as a result of his death at $-100$. What is now the opportunity cost of continuing living for Hamlet? Should he choose "to be" or "not to be" in this case? (2 Points)

   `Benefit:` $-100$`, Opportunity cost:` $-150$
   `or, Benefit:` $0$`, Opportunity cost:` $-50$

   `To be`

# Problem 2 (10 Points)

1. What is your understanding of the concept of "内卷"? What does it mean? (4 Points)
2. Can you use supply and demand diagrams to illustrate the concept of "内卷" in the Chinese labor market? (2 Points)
3. Does the phenomenon of "内卷" actually exist? Can you find any empirical evidence? What data do you ideally need to have in order to convincingly show that the phenomenon of "内卷" is actually happening? (4 Points)

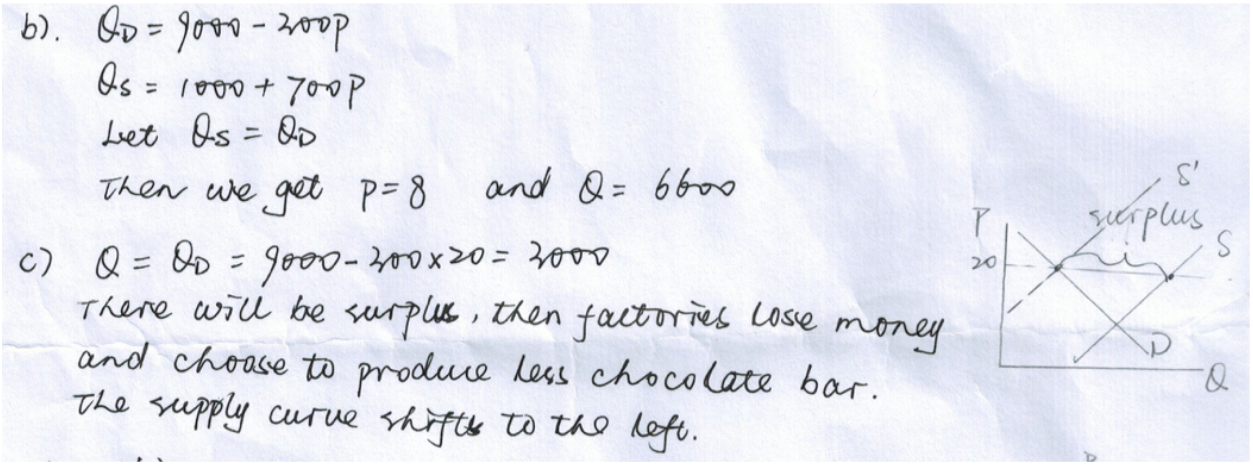
`See notes on involution.`

# Problem 3 (4 Points)

Market research reveals the following information about the market for chocolate bars: The demand schedule can be represented by the equation $Q_D = 9000 - 300P$, where $Q_D$ is the quantity demanded and $P$ is the price. The supply schedule can be represented by the equation $Q_S = 1000 + 700P$, where $Q_S$ is the quantity supplied.

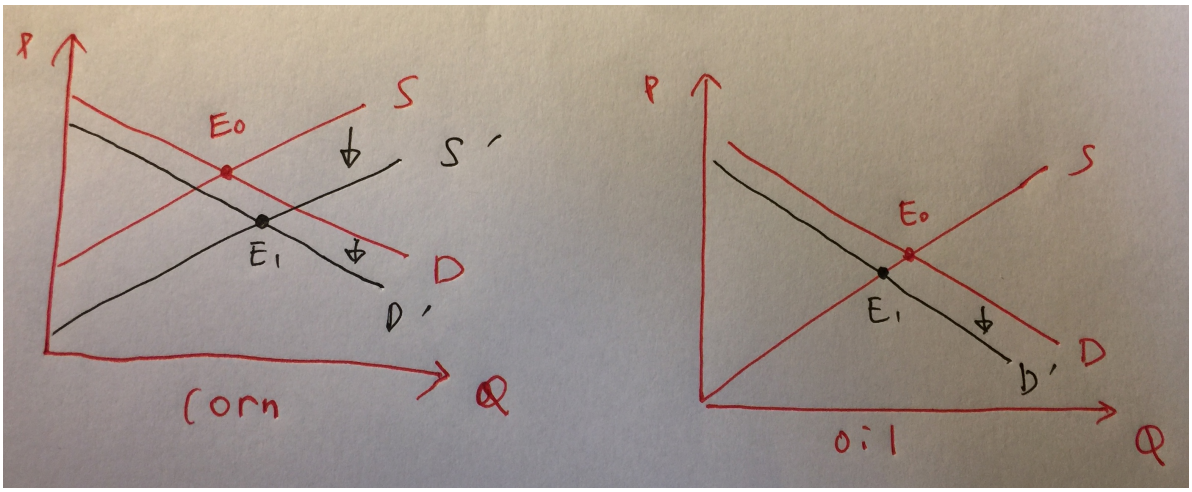
1. Graph the demand and supply curves and calculate the equilibrium price and quantity. (2 Points)

2. If the government establishes a price floor of \$20 per chocolate bar, how many chocolate bars will be sold? What do you expect might happen as a result? (2 Points)



# Problem 4 (2 Points)

A and B are two goods that are substitutes for each other. Suppose the supply of A increases as a result of productivity increase. Using supply and demand diagrams, illustrate what happens to the equilibrium prices and quantities of A and B.



# Problem 5 (6 Points)

The markets for corn and oil are described by the following demand and supply equations:

$$\begin{aligned}\text{Corn Demand: } & Q_D^C = 500 - 2p^C + p^O \\ \text{Corn Supply: } & Q_S^C = 10 + p^C \\ \text{Oil Demand: } & Q_D^O = 200 - 15p^O + 2p^C \\ \text{Oil Supply: } & Q_S^O = 50 + 4p^O\end{aligned}$$

, , where $p^C$ is the price of corn (in \$/bushel), $p^O$ is the price of oil (in \$/gallon), $Q_D^C$ and $Q_S^C$ are respectively the quantity demanded and supplied of corn (in bushels), and $Q_D^O$ and $Q_S^O$ are respectively the quantity demanded and supplied of oil (in gallons).

1. Solve for the equilibrium price and quantity of corn and oil. (2 Points)

   $p^C = 172, Q^C = 182, p^O = 26, Q^O = 154$

2. Are corn and oil substitutes, complements, or neither? (2 Points)

   `substitutes`

3. Suppose as a result of technology progress, corn's supply curve becomes

   $$Q_S^C = 65 + p^C$$

   Solve for the new equilibrium price and quantity of corn and oil. Do your results agree with your answer to Problem 4 (2 Points)? (2 Points)

   $p^C = 153, Q^C = 218, p^O = 24, Q^O = 146$

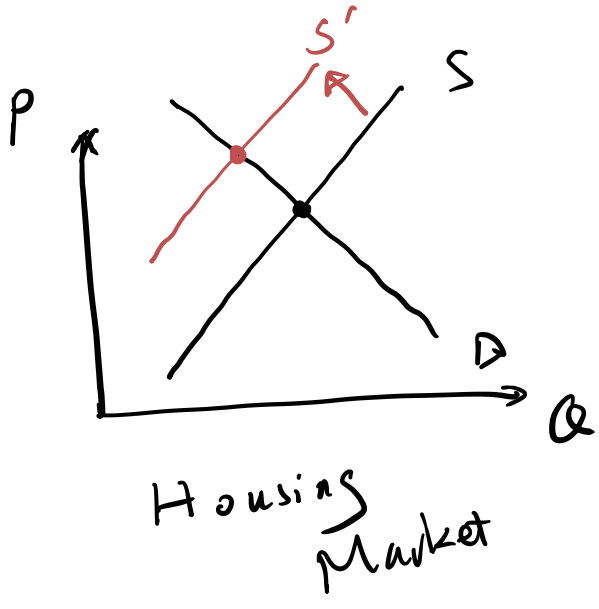
# Problem 6 (18 Points)

Let's talk about the Chinese housing market. Read the following articles:

- Financial Times, "Evergrande and the end of China's 'build, build, build' model," 2021/09/22.
- Financial Times, "Half of China's top developers crossed Beijing's red lines," 2021/10/09.
- Foreign Policy, "China's Property Sector Has Bigger Problems Than Evergrande," 2021/09/29.

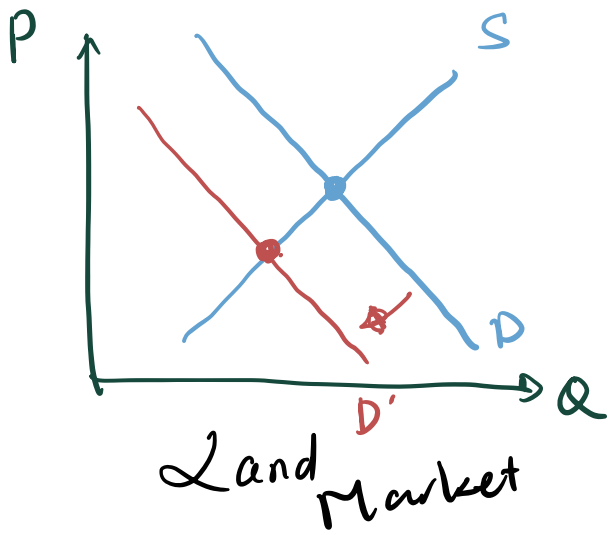
Answer the following questions:

1. What are the "three red lines" and why does the Chinese government impose them? (4 Points)
   (a) $\texttt{debt ratio}\ \left(\frac{\texttt{liabilities}}{\texttt{assets}}\right) < 0.7$
   (b) $\texttt{net gearing}\ \left(\frac{\texttt{net debt}}{\texttt{equity}}\right) < 1.0$
   (c) $\texttt{cash ratio}\ \left(\frac{\texttt{cash \& cash equivalents}}{\texttt{short-term debt}}\right) \geq 1.0$
2. Using supply and demand diagrams, illustrate what happens to the housing market when the government restricts developers' ability to borrow[1]. (2 Points)

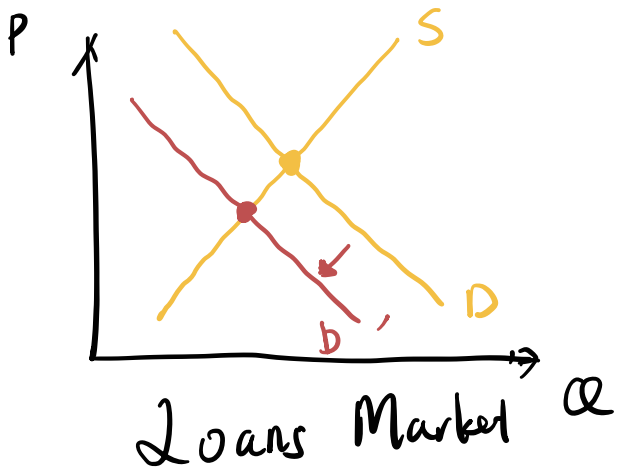



[1] In this as well as all the following exercises, we assume *ceteris paribus*: all else being equal. In other words, you should conduct your supply and demand analysis assuming that the only thing that happens is the event mentioned in the exercise.

3. Using supply and demand diagrams, illustrate what happens to the land market when the government restricts developers' ability to borrow. (2 Points)



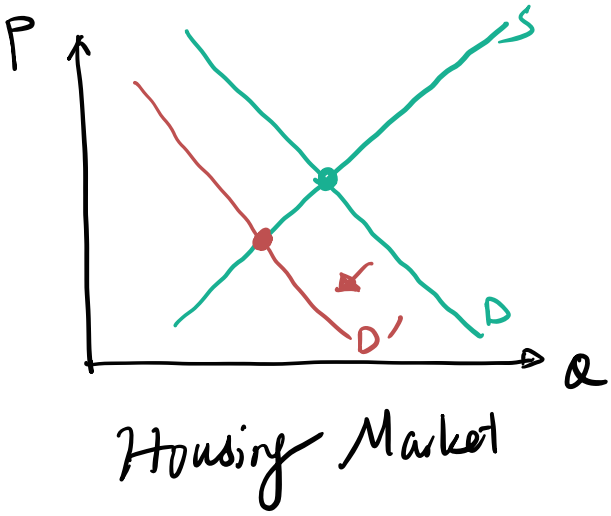

4. Using supply and demand diagrams, illustrate what happens to the financial market – specifically, the demand and supply of loans – when the government restricts developers' ability to borrow. (2 Points)



5. It is said that Evergrande is "*too big to fail*."[2] Explain the concept of **moral hazard** and its connection with "*too big to fail*."[3] (2 Points)

   Moral hazard refers to the tendency of behaving irresponsibly in a long term, usually contractual, relationship. If a company is "too big to fail", i.e., if it is too important for the economy, then the company can expect the government to bail it out when it runs into trouble. The company can therefore behave irresponsibly in pursuit of short-term profits, such as taking on a large amount of debt. This is called moral hazard.

6. Using supply and demand diagrams, illustrate what happens to the housing market when marriage and birth rates decline. (2 Points)




7. What could be some of the long-term consequences of a weaker Chinese housing sector? (4 Points)

   Lower local government spending (loss of land revenue), lower GDP growth (real estate sector directly contributes around 29% of Chinese GDP)

[2]Though not required for answering this question, I recommend reading the following 2017 report on Evergrande by GMT Research.

[3]From the FP article: "The story of how China's property market reached this point is an illustration of both Beijing's power over market forces and its limitations. The property market kept expanding because investors and developers generally thought that it was far too important for Beijing, which depended on it to maintain rapid rates of economic growth and households' net worth, so any downturn would be short-lived."