ECON 403 Homework #1: Loan Rate and Target Price

Due: Wednesday, February 6, 2019

Consider the following respective demand and supply functions:

$$P^d = 500 - 0.1\,q \qquad \text{and} \qquad P^s = 0.05\,q \qquad \text{quantity measured in tonnes and price in \$/tonne}$$

1. What is the equilibrium price and demand? What are the associated producer and consumer surpluses? Build a model in R to draw the supply and demand functions and calculate the market clearing price and quantity, and the associated welfare areas.

2. Suppose there is only a support price (target price) set at \$210/t. How much will farmers produce? Assume no trade and that the market must clear. How much will consumers have to pay? What are the producer and consumer surpluses in this case? What is the cost to the government (the deficiency payment)? What is the deadweight loss?

3. In the U.S., a farmer can sell her crops to the Commodity Credit Corporation (CCC) at the loan rate, which is set in advance of the growing season. The farmer takes out a loan and delivers the crop at harvest to repay the loan. If the loan rate exceeds the market price, the farmer will sell the crop to the CCC; if the market price exceeds the loan rate, she will sell the crop in the market and use the proceeds to pay back the loan from the CCC. Introduce a loan rate of \$200/t. How much will farmers produce at the loan rate? What will consumers pay? What are the producer and consumer surpluses, and the deadweight loss? What is the cost to the CCC?

4. Now impose the target price over and above the loan rate. Assume two cases: (i) where producers make a decision using only the loan rate and (ii) where producers make a decision using the target price. <u>For each,</u> calculate:
(a) What is produced? What is the associated market clearing price?
(b) What are the producer and consumer surpluses?
(c) What is the CCC payment? What is the deficiency payment?

ALL CALCULATIONS ARE TO BE DONE USING R.