

Exam 2: Review

Review Session: November 2, 2011. Linfield Hall 109 – 5:30 p.m. - 7:00 p.m.

Equilibrium Displacement Model Concepts

Consider the market for European barley, characterized by:

$$D_{\text{barley}} : P_b^D = 250 - 5Q_b + 10P_{\text{rice}} + 50P_{\text{corn}}$$

$$S_{\text{barley}} : Q_b^S = 120 + 0.5P_b - 0.5P_{\text{wheat}} - 2P_{\text{corn}}$$

$$P_b = 10\text{€} \quad P_{\text{rice}} = 6\text{€}$$

$$P_{\text{corn}} = 5\text{€} \quad P_{\text{wheat}} = 10\text{€}$$

Recent news indicates that the demand for malting barley (used in production of beer) rose by 1.5% while the supply of malt barley dropped by 0.5%.

1. Analyzing only the malt barley market, determine the percentage change in the price and quantity of malt barley.
2. You know that there is a relationship between the corn and barley market. A simple representation of the corn market is as follows:

$$D_{\text{corn}} : P_{\text{corn}}^D = 15 - 0.5Q_{\text{corn}} + 3P_{\text{barley}}$$

$$S_{\text{corn}} : Q_{\text{corn}}^S = 40 + 3P_{\text{corn}} - 0.5P_{\text{barley}}$$

with prices as specified above. How would shocks to the malt barley market impact the barley market when feedback effects from the corn market are incorporated?

3. Explain the differences in results of (1) and (2).
4. After a recent World Agricultural Supply and Demand Estimates (WASDE) report, you find that European corn harvests are down by 5%. This decrease is expected to be in addition to the shocks in the malt barley market. How will the corn market change impact the percentage change in prices and quantities of malt barley?

Derived Demand Concepts

Graph the following in related retail and farm level markets. Label everything very carefully.

Consider the market for products derived from sheep. Suppose that one sheep can yield a fixed proportion of mutton (meat) and wool. Mutton is not very popular among U.S. consumers, but wool is highly prized.

1. Illustrate an initial equilibrium condition that exists in the retail and related farm markets. Identify the equilibrium quantity and prices in **each** market.
2. In each of the following scenarios, illustrate the effects of a market change and describe the changes in quantities and prices.
 - (a) Input costs increase at the farm level.
 - (b) The price of goat meat (a substitute to mutton) has dropped.
 - (c) A natural disaster destroyed several large sheep processing facilities.
3. Use the following information to solve for the equilibrium quantity and prices of both **farm level** and **retail level** sheep products. Furthermore, solve for the total value added by processing sheep into retail-level products.

Retail Market

$$D_{mutton} : P_{mutton} = 2050 - 2Q$$

$$D_{wool} : P_{wool} = 2750 - 2Q$$

Processing and Marketing

$$S_{P\&M} : P_{P\&M} = -400 + Q$$

Farm-level Sheep Production

In producing sheep, farmers are required to purchase feed and labor/maintenance services. Fixed costs are \$100 and labor is supplied according to the function: $P_L^S = -1900 + 2Q$.

4. Using the markets defined in (3), analyze the market changes if labor costs increase and the new labor supply function is: $P_L^S = -1600 + 2Q$. Solve for the new equilibrium quantities and prices in both the farm and retail markets. Furthermore, solve for the new total value added by processing sheep into retail-level products.

5. Using the markets defined in (3) and (4), analyze the market changes if there is a drop in the demand for mutton, causing the new retail-level mutton demand function to be: $D_{mutton} : P_{mutton} = 1950 - 2Q$. Solve for the new equilibrium quantities and prices in both the farm and retail markets. Furthermore, solve for the new total value added by processing sheep into retail-level products.

Spatial Concepts

Use spatial net price diagrams to model the following scenarios:

1. A farmer can deliver to three elevators, which are located in three different locations. However, the farmer only has time to deliver to two of these elevators. Each location offer different prices. Model this scenario to show which two locations the farmer will choose to deliver.

2. Prior to the Panama canal, if North American agricultural producers wanted to deliver to western South America, the products had to be transported by boat all the way around the southern tip of South America. Opening of the Panama canal has opened a much more direct route to ship products from eastern North America to western South America. Illustrate and explain how the Panama canal affected the profitability region of eastern North American agricultural producers.

3. In the early to mid 20th century, there were very many small processing facilities through the mid-west and Great Plains agricultural regions. However, as technological advances continued to evolve, new, much larger processing plants were established. There much less of these large plants, but they used economies of scale to offer a much higher price for agricultural commodities than smaller processing facilities. Using a spatial diagram, illustrate several small processing plants offering low prices to farmers and one large facility location that offers a much higher price, such that the profitability regions of all of the small facilities is encompassed by the single large facility. What will farmers do? What will happen to the small facilities?

Trade Concepts

Consider an international market for pork. Mexican consumers have a high preference for pork products, but Mexican producers provide an insufficient quantity of pork to meet the demand of domestic consumers. Therefore, the U.S. exports pork to Mexico.

1. Using a three-diagram trade model, illustrate the trade market between U.S. and Mexico. As usual, label carefully.
2. Now, consider that in the past 20 years, Mexico has seen a rapid expansion of its middle class (prior to this time, there was a substantial dichotomy, in which a small portion of the Mexican population had a lot of money, and a large portion of the population was very poor.) Illustrate how the expansion of the Mexican middle class impacts the trade market. Show the changes in the trade, Mexican domestic, and U.S. domestic markets.
3. Suppose that the Mexican government believes that the U.S. is flooding their market with pork and artificially low prices, which is hurting the Mexican pork producers. In response, Mexico institutes a quota on U.S. pork imports. Show how the quota will affect the trade and domestic markets, and point out the change in consumer and/or producer surpluses in each market.

Putting it all together

Consider modeling the economics of wheat marketing. First, consider the retail and farm level markets. Wheat can be processed flour or used to brew beer. The demand for beer is domestic only. However, the demand for flour consists of U.S. demand and the demand for flour by Japan. therefore, also there is a trade market for flour between the U.S. and Japan, in which Japan imports U.S. flour.

1. Illustrate the retail level market for products that are derived from wheat and the associated farm-level wheat market. When labeling the demand for flour, make sure that you indicate that this demand is a sum of domestic (U.S.) and foreign (Japanese) demands. Label carefully.
2. Use the following information to solve for the equilibrium values of quantity and prices of wheat, flour, and beer.

Retail Market

$$D_{beer} : P_{beer} = 55 - Q$$

$$D_{flour, U.S.} : P_{flour, U.S.} = 70 - Q$$

$$D_{flour, Japan} : P_{flour, Japan} = 80 - Q$$

Processing and Marketing

$$S_{P\&M} : P_{P\&M} = 160 + Q$$

Farm-level Wheat Production

In producing wheat, farmers are required to purchase fertilizer and labor/maintenance services. Fertilizer is \$50, and labor is supplied according to the function: $P_L^S = -55 + Q$.

- Using a three-diagram trade model, illustrate the trade market for wheat.
- Suppose that the Japanese demand for flour increases. Using the trade model, illustrate what will happen to quantities and prices in each of the domestic markets and the trade market.
- Recall that the demand for U.S. flour is a combination of the demands by U.S. and Japanese consumers. Illustrate the effect of a Japanese demand increase on the retail and farm markets.
- Suppose that the Japanese increase in demand is reflected by the new flour demand function: $D_{flour, Japan} : P_{flour, Japan} = 100 - Q$. Solve for the new equilibrium prices and quantities in the retail and farm markets.
- Does your illustration in the trade market *match* what you've illustrated in the retail/farm level markets and the changes that you see in the equilibrium quantities and prices?