

Aggregating Supply and Demand – Private Goods¹

In-Class Problem²

Suppose the US provides the world's supply of Grits and that no other economy has come to realize the sublime nature of this amazing product. The market for Grits is represented by the following supply and demand equations where Q is quantity in millions of pounds:

$$Q_S^{US} = 5P - 5 \tag{1}$$

$$Q_D^{US} = 16 - 2P \tag{2}$$

a) Provide a table for this market representing P, Q_S and Q_D starting with P = \$1 and continuing until Q_D = 0

<i>Price</i>	<i>Quantity_S^{US}</i>	<i>Quantity_D^{US}</i>
\$1	0	14
\$2	5	12
\$3	10	10
\$4	15	8
\$5	20	6
\$6	25	4
\$7	30	2
\$8	35	0

b) Identify the market clearing values of price and quantity

This can be seen through the above table where **P = \$3** and **Q_S = Q_D = 10**, but it can also be calculated by setting Q_S = Q_D and solving for P* and Q* in the usual manner:

$$5P - 5 = 16 - 2P$$

$$7P = 21$$

$$P^* = \$3 \tag{3}$$

$$Q^* = 5(3) - 5 = 10 \tag{4}$$

¹ This primer is intended to present an abbreviated discussion of the included economic concepts and is not intended to be a full or complete representation of them or the underlying economic foundations from which they are built.

² This In-Class Problem was developed by Rick Haskell, Ph.D. Student, Department of Economics, College of Social and Behavioral Sciences, The University of Utah, Salt Lake City, Utah (2014).

Now let's assume that the French came to the realization that Grits are an enlightened culinary delight, motivating a demand for Grits: $Q_D^F = 9 - 2P$

c) What is the demand equation for the "world demand" for Grits?

We find this by aggregating the demand equations for the US and French markets using the governing dynamics for private goods: $P_1=P_2=\dots=P_N = P^*$; $Q_1+Q_2+\dots+Q_N = Q^*$; $P=MR=MC$

$$Q_D^{US} = 16 - 2P$$

$$Q_D^F = 9 - 2P$$

$$Q_D^F + Q_D^{US} = 16 - 2P + 9 - 2P$$

$$Q_D^W = 25 - 4P \tag{5}$$

d) How does this change the market clearing values for Grits?

We find this by setting the US supply and World demand equal to each other (recall that the US is the only supplier of Grits in this example)

$$5P - 5 = 25 - 4P$$

$$9P = 30$$

$$P^W = \$3.33 \tag{3}$$

$$Q^W = 5(3.33) - 5 = 11.67 \tag{4}$$

e) What does this do to the price and quantity of Grits in the US market?

We find this by using the world price (PW) and substituting it into the US demand equation. This suggests that US consumers will now have to pay the world price for Grits, which only makes sense; why would US suppliers sell Grits at a lower price than they could get on the world stage?

$$P^W = P^{US} = \$3.33$$

$$Q_D^{US} = 16 - 2(3.33) = 9.34 \tag{6}$$

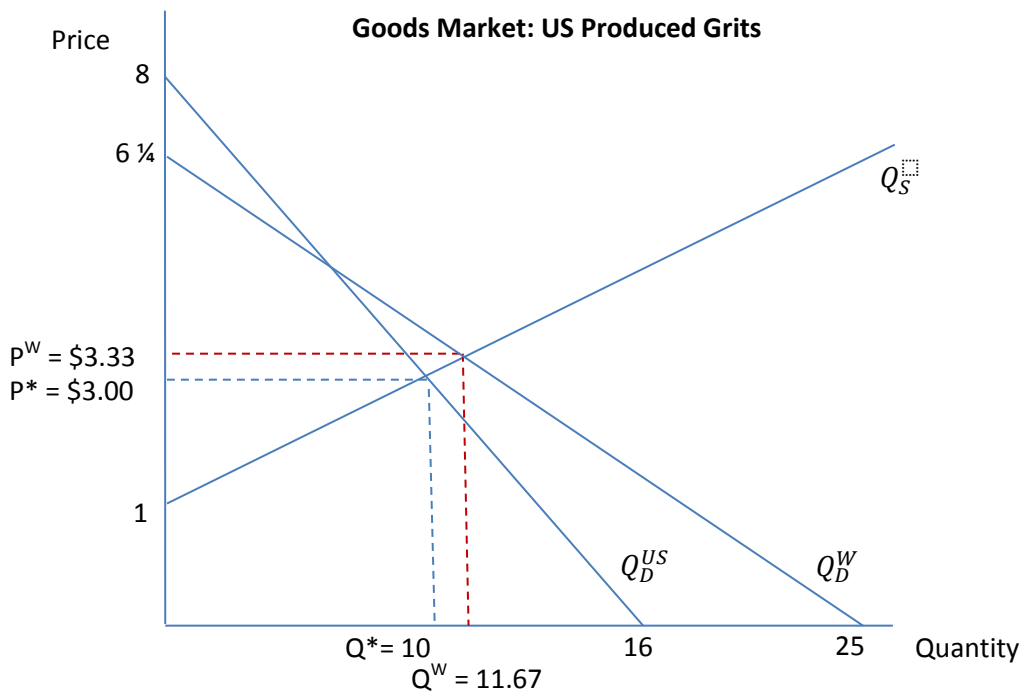
f) What is the price and quantity combination for Grits in France (in US\$)?

We can find this the same way we found the US price and quantity or we can simply subtract the US quantity from the world quantity to reveal the quantity available to the French at the market clearing (equilibrium) price.

$$P^W = P^F = \$3.33$$

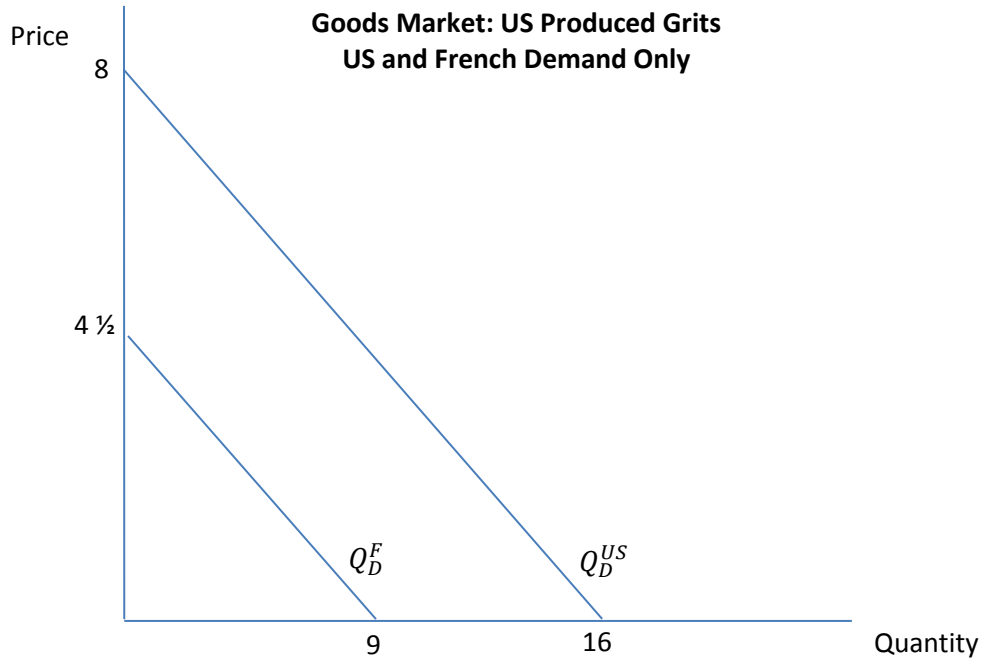
$$Q^W - Q_D^{US} = 11.67 - 9.34 = 2.33 = Q_D^F \tag{7}$$

g) Provide a graph showing the change in the goods market for Grits based on France's realization.



So this results in an interesting change in the demand curve. Demand is now greater at low price levels, but actually less at higher price levels. This might be caused by relatively weak demand, which we might expect for a product just beginning to be experienced in a new market, or by some serious price sensitivity on the part of the French. Let's isolate this by taking a look at the US and French demand curves. By so doing we see that the demand in France is actually pretty weak compared to the demand in the US, which makes sense to us since the French are only beginning to understand the wonders of Grits. The US consumer represents some demand at any price under \$8, but the French consumer's demand is much lower, at a

price of \$4½ or less. The slope of the two demand curves are the same, so each market responds similarly to changes in price, but the absolute level of demand in France is less.



When we overlay the “world” or combined demand on the demand relations for the respective nations we see how the French demand actually “weakens” the demand curve at higher prices.

