

EXPERIMENT 4

AN EXCISE TAX IN THE APPLE MARKET

STUDENT INSTRUCTIONS

Introduction

There is a hint of frost in the air and the leaves are changing colour. You regularly go to the Farmers' Apple Market to buy and sell bushels of apples. One day, the local authority decides to collect a tax of €15 for each bushel of apples sold.


Instructions (for all scenarios)

In this experiment, you will try to make profits by buying or selling (imaginary) bushels of apples. In each market scenario, you will be assigned a role, either as a supplier who can sell one bushel of apples or as a demander who can buy one bushel of apples (Figure A).

Your objective is to make as much profit as possible. Profit will be measured in 'currency units', that we will denote with a currency sign (€, £, or \$; we will use € in these instructions).

If you are a supplier, you will be assigned a Seller Cost (the cost of growing a bushel of apples) and you can sell at most one bushel of apples per round. If you sell a bushel of apples for a price P , and your Seller Cost is SC , then your profit from the transaction is the difference, $P - SC$. If $P < SC$, you are better off not selling and taking zero profits rather than selling for a loss.

If you are a demander, you will be assigned a Buyer Value (your willingness to pay for a bushel of apples). You can buy at most one bushel of apples per round. If your Buyer Value is BV , and you buy one bushel of apples for a price P , your profit from the transaction will be $BV - P$, that is, the difference between how much you value the bushel of apples and how much you paid for it. If you have to pay more than your Buyer Value, you are better off not buying any apples and taking zero profits rather than doing it for a loss.




395121

Session 1 Round 1 Type

In this session, you are an apple supplier and your seller cost for a bushel of apples is

items

1




SELL

other

price €

contracts

no contracts




Session 1 Round 1 Type

In this session, you are an apple demander and your buyer value for a bushel of apples is

items

no items



BUY

price €

contracts

no contracts

Figure A Screenshots of a supplier and a demander for online trading. Screens are the same for in-class trading, except that demanders do not have the 'Buy' button and are assigned an ID number (see Figure B).

1. Supplier.

2. Demander.

At the beginning of the experiment, your instructor will announce whether you are using online or offline trading.

Offline trading

In offline trading, sellers and buyers must find each other and agree on a price. If they reach an agreement, the seller should type the price and the buyer's ID into her screen and select the 'Sell' button. The buyer must accept the offer to finalize the contract (Figure B).

The sales contract is then publicly displayed on the instructor's screen (Figure C).

It is a good idea to think in advance about what you will do the first time you are in the market and negotiating with other students. There are many strategies you could use and there is not a single right answer. But remember to shop around and look at the prices that have already been posted on the instructor's screen.

Online trading


In the online market, sellers can send a selling price that demanders will see in the contracts section of their screens (Figure D). Similarly, buyers can send a buying price that suppliers will see in the contracts section of their screens. Whether you are a supplier or a demander, your offer (if you made one) and all standing offers you can accept are shown in the contracts section of your screen. You can withdraw your offer and make a new one only if it has not been accepted yet. You can accept an offer by selecting the 'Accept' button. Note that once you accept an offer or your offer gets accepted, all other offers are automatically rejected, as you can only trade one bushel of apples.



When a buyer accepts a selling offer or a seller accepts a buying offer, the transaction takes place and is displayed on the instructor's screen. Since only one unit can be traded in each round, the buyer and the seller cannot make more transactions until the next round. The instructor's screen also displays the standing buying and selling offers (Figure E). Look at it frequently for a general picture of standing offers and to get an idea of the price at which apples are being traded.


Instructions for Scenario 2 (sellers pay a €15 tax)


In Scenario 2, sellers have to pay an excise tax of €15 if they make a sale. (An excise tax is a per-unit tax imposed on a particular good or service.) If you are a supplier with Seller Cost SC and you sell a bushel of apples for price P , then your profit from the transaction is $P - SC - 15$. Remember, you only have to pay the tax if you sell your apples. If your cost of selling the bushel of apples (including taxes) is higher than the price you are offered, you are better off not selling and taking zero profits rather than selling for a loss.

A demander with Buyer Value BV who buys at price P makes a profit of $BV - P$, and a profit of 0 if he does not buy.

class EX	
<p>Session 1 Round 1 Type</p> <p>In this session, you are an apple supplier and your seller cost for a bushel of apples is SC</p>	
<p>items</p> <p>1 </p> <p>Demanders ID 5</p> <p>SELL</p> <p>P €</p>	<p>Price</p>
<p>contracts</p> <p>no contracts</p>	

class EX	
<p>Session 1 Round 1 Type</p> <p>In this session, you are an apple supplier and your seller cost for a bushel of apples is SC</p>	
<p>items</p> <p>1 </p>	<p>ID 5</p>
<p>contracts</p> <p>sell 1  for P</p> <p>WITHDRAW</p>	

class EX	
<p>Session 1 Round 1 Type</p> <p>In this session, you are an apple demander and your buyer value for a bushel of apples is BV</p>	
<p>items</p> <p>no items</p>	<p>ID 5</p>
<p>contracts</p> <p>buy 1  for P</p> <p>ACCEPT REJECT</p>	

class EX	
<p>Session 1 Round 1 Type</p> <p>In this session, you are an apple supplier and your seller cost for a bushel of apples is SC</p>	
<p>items</p> <p>no items</p>	<p>ID 5</p>
<p>contracts</p> <p>sell 1  for P</p> <p>accepted</p>	



class EX	
<p>Session 1 Round 1 Type</p> <p>In this session, you are an apple demander and your buyer value for a bushel of apples is BV</p>	
<p>items</p> <p>1 </p>	<p>ID 5</p>
<p>contracts</p> <p>buy 1  for P</p> <p>accepted</p>	

Figure B Offline trading: Once a buyer and a seller have reached a verbal agreement, they can formalize the transaction on their devices.



	time	Buyer Value	Seller Cost	Price in €
1	12:55:00	BV1	SC1	P1
2	13:01:25	BV2	SC2	P2

Figure C Completed transactions appear in the instructor's screen, showing the Buyer Values (BV), the Seller Costs (SC), and the prices (P).

Instructions for Scenario 3 (buyers pay a €15 tax)

In Scenario 3, buyers have to pay the excise tax of €15 if they buy a bushel of apples. If you are a demander with Buyer Value BV and you buy a bushel of apples for price P , then your profit from the transaction is $BV - P - 15$. Remember, you only have to pay the tax if you buy apples. If your cost of buying a bushel of apples (including taxes) is higher than your Buyer Value, you are better off not buying and taking zero profits rather than obtaining a loss.

A supplier with Seller Cost SC who sells at price P makes a profit of $P - SC$, and a profit of 0 if she does not sell.

HOMEWORK QUESTIONS

Your instructor shared with you the following information regarding the experiment: transactions, prices, and profits in the last round of each scenario, and the distribution of Buyer Values and Seller Costs.

A simple competitive market (Scenario 1)

- Using the distribution of types, draw a graph showing both the demand and supply curves, and calculate the predictions of the theory for a competitive market.
- Find the theoretical predictions for price and quantity at the intersection of the demand and the supply curves. If competitive equilibrium theory predicts a range of possible equilibrium prices, use the midpoint of this range. Compute consumer surplus, producer profits, and total surplus (consumer + producer surplus).
- Use the data from your classroom experiment to calculate mean (average) price, the number of transactions, total profits of demanders, total profits of sellers, and total profits of all participants.
- Compare the experimental results in question 3 with the predictions made by the supply and demand theory in question 2.

Exercise 8.3 (<https://tinyco.re/5845630>) in *The Economy* shows how to draw supply and demand 'curves' when they are step functions.

1. Selling

The seller types the agreed price P and the buyer's ID (5) on her screen and selects the 'Sell' button.

2. Buying

The buyer must accept the offer to finalize the transaction. Before it is complete, both the seller and the buyer can cancel the transaction by withdrawing or rejecting the offer, respectively.

3. The transaction

Once the buyer has accepted the transaction, the bushel of apples moves from the seller to the buyer. They cannot do anything else until the next round, since at most one unit can be bought or sold in each round.

class

Ex

Session 1 Round 1 Type

In this session, you are an apple supplier and your seller cost for a bushel of apples is .

items

1

contracts

sell 1

for

ACCEPT

OWN

sell 1

for

WITHDRAW

class

Ex

Session 1 Round 1 Type

In this session, you are an apple demander and your buyer value for a bushel of apples is .

items

no items

price €

BUY

contracts

buy 1

for

ACCEPT

buy 1

for

ACCEPT

buy 1

for

ACCEPT

Figure D Example of a seller's and a buyer's screen for online trading.

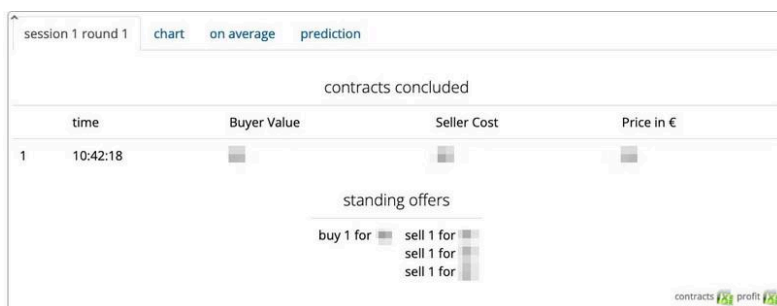


Figure E Instructor's screen showing one completed transaction and standing buying and selling offers.

A per-unit excise tax on sellers (Scenario 2)

1. Use the data from your classroom experiment in Scenario 2 to calculate mean (average) price, the number of transactions, total profits of demanders, total profits of sellers, total taxes collected, and total profits of all participants plus taxes collected. (When computing total profits of buyers and sellers, do not include any tax revenue.)
2. What was the effect of the tax collected from sellers on the average price? Did total profits of buyers and sellers fall more or less than the amount of tax revenue collected? Why do you think this happened?
3. Copy the supply and demand graph for a market without taxes (that you drew for question 1 in Scenario 1). Add a dashed line to show the supply curve that applies when suppliers have to pay a tax of €15, as in Scenario 2. What effect did the tax have on the supply curve?
4. Determine the theoretical prediction of the competitive equilibrium prices and quantities with and without the tax.
5. Use the information in questions 1 and 2 to calculate total profits of buyers, total profits of sellers, and total taxes collected by the government. (Remember that here you are calculating the values predicted by competitive theory, not the actual outcomes observed in the experiment.)
6. Calculate the excess burden as the difference between total profits without taxes and total profits plus tax revenue with a tax on sales.
7. Compare the experimental results with the competitive predictions.
8. Compare the price paid by buyers without and with the tax. Compare the effective price received by sellers without and with the tax (that is, the price received minus €15). Who actually *paid* (bore the burden of) the tax?

1. Selling

A seller has sent a selling offer (marked as 'OWN') and has received one buying offer. She can withdraw the offer, as no buyer has accepted it yet.

2. Buying

A buyer has received three selling offers and must decide whether to accept any of them or none. He has not made his buying offer yet.

A per-unit excise tax on buyers (Scenario 3)

1. Repeat the calculations in 'A per-unit excise tax on sellers' for the case when the tax is collected from buyers.
2. Compare the distribution of the burden of the tax when sellers collected the tax and when the buyers collected the tax. Does it matter who collected the tax? If so, in what ways?

FURTHER READING

- Unit 8 in *The Economy* discusses many of the issues covered in this experiment. Section 8.1 (<https://tinyco.re/0286376>) and 8.2 (<https://tinyco.re/7495730>) describe the market without taxes, while the effect of taxes is presented in Section 8.7 (<https://tinyco.re/3836426>).
- 'Governments look to heavier taxes in battle of the bulge' (*Financial Times*, 22 February 2017) examines the potential effects of a sugar tax on health and consumption decisions, and on prices in other markets.
- 'Tax Me Please' (*Planet Money*, NPR, 15 January 2010) looks at Denmark's high taxes and their connection to the provision of quality healthcare and education.
- "'Sin" taxes—eg, on tobacco—are less efficient than they look' (*The Economist*, 28 July 2018) evaluates the arguments for and against 'sin taxes'.
- Reed, Michael R., Xiaojin Wang, Yuqing Zheng, and Chen Zhen. 2015. 'Cigarette Tax Pass-Through by Product Characteristics: Evidence from Nielsen ScanTrack Data'. AAEA & WAEA Joint Annual Meeting, July 26–28. Agricultural and Applied Economics Association. In this article, the authors examine who bears the economic burden of cigarette taxes.
- 'Assessing the incidence of value-added taxes' (Vox-EU, 13 November 2017) investigates who benefited from a VAT cut on sit-down restaurant meals in France.