Economics 101: Basic Economic Principles
Problem Set #2 (due at the beginning of class on **Monday, February 24**)
*You are welcome to work in groups of two, but you do not have to. If you work in a group, be sure to include the names of your group members and hand in just one copy of the problem set for the group.
This problem set covers chapters 3, 4, 5, 6, 7 and 8.

Instructions: For each of the multiple choice questions, please **include a short explanation** with your answer. Be sure to **show your work** whenever appropriate.

Part I: Multiple Choice.

1. The table below shows the hypothetical utility schedule for a consumer of movies.

Number Consumed	Total Utility
0	0
1	10
2	22
3	40
4	65
5	85

This consumer begins to experience diminishing marginal utility when consuming the:
A) third movie.
B) fourth movie.
C) fifth movie.
D) sixth movie.
E) first movie.

2. The cross elasticity of demand between digital cameras and memory cards is likely to be:
A) Zero.
B) A negative number.
C) A positive number greater than 1.
D) A positive number between zero and 1.

3. A glass company making windows for houses also makes windows for other things (cars, boats, planes, etc.). We would expect its supply curve for house windows to be:
A) Dependent on the demand for boat and plane windows.
B) No different than that of firms which only make those windows.
C) Relatively more elastic than those of firms which only make house windows.
D) Relatively more inelastic than those of firms which only make house windows.

4. To increase revenues an ice cream retailer is planning to decrease prices. This action will have the desired effect of increasing revenues if:
A) demand for that particular ice cream is elastic.
B) demand for that particular ice cream is inelastic.
C) demand for that particular ice cream has zero price elasticity.
D) price elasticity of demand for that particular ice cream is unitary.

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5. Consider the following hypothetical market demand schedule for tomatoes:

Point	Price ($/bushel)	Quantity Demanded (million bushels/year)
A	20	1
B	18	3
C	16	5
D	14	7

The absolute value of the average (or midpoint) price elasticity of demand between points B and D is: _____. (Be sure to show your work.)

6. Which of the following statements concerning a pure public good is false?

A) It is impossible to exclude nontaxpayers from the enjoyment of the public good.

B) All benefits associated with the production and use of a public good are received by the government.

C) The availability of a public good to one person simultaneously makes it available to all members of society.

D) The private sector does not have an economic incentive to produce a socially optimal amount of a public good.

Part II: Short Essay.

1. The income elasticity of demand for food is roughly 1. Suppose a consumer's monthly income is $2,000, of which 20 percent is spent on food. If the income of this consumer doubles, calculate the amount she'll spend on food.

2. Mr. Ida H. O. Potato is a lover of starchy foods. In fact, he consumes only two products, mashed potatoes and sourdough bread. The price of bread is $1.00 per loaf and the price of potatoes is $1.50 per pound. With his weekly allowance of $30 he chooses to consume 15 loaves of bread and 10 pounds of potatoes.

A) What can you conclude about Ida's marginal utility associated with the 10^{th} pound of potatoes he consumes in comparison to his marginal utility associated with the 15^{th} loaf of bread he consumes?

B) The major potato growers in the region suffer a drought. Illustrate (using a supply and demand diagram) the short-run impact of this drought on the market for potatoes. What happens to the equilibrium price in this market? If demand for potatoes is relatively elastic, will the farmers' total income increase or decrease?

C) After the drought is Ida's original bundle still affordable? Assuming that Ida is a rational consumer, what will he do in response to the change in price? Please explain in a sentence or two.

3. Use prospect theory to explain why a cereal maker faced with a cost increase would prefer to reduce the size of the box of cereal rather than increase its price to offset the cost increase.

4. The owner of a restaurant is considering lowering menu prices to draw in more customers. They are debating between lowering the price for the steak entrée or the salmon entrée. When they lowered prices last year, a $2.00 decrease in price for the $15 steak resulted in a growth in steak sales from 75 per week to 100 per week. A $2.50 decrease in the price of the $17 salmon entrée increased sales from 40 to 75 meals per week. Which entrée should they choose to put on sale?

5. Consider the following table showing the marginal utility schedules for pizza and coke for Ms. Sanchez. These are the only two goods that she purchases on a weekly basis. The price of a bottle of coke is $1 and the price of a slice of pizza is $2. Ms. Sanchez's weekly income is $10.

Coke		Pizza	
Quantity	MU	Quantity	MU
1	32	1	48
2	28	2	40
3	24	3	32
4	20	4	24
5	16	5	16
6	12	6	8

A) How much coke and pizza will Ms. Sanchez buy each week to maximize her utility?

B) If the price of coke increases to $2, how will Ms. Sanchez's consumption bundle change? (Remember that the goal is to maximize utility.)

C) Using the information from parts A and B, construct Ms. Sanchez's demand curve for coke.

Part III: Long Essay.

1. Parts A) through D): Consider the market for surfboards in southern California. Initially it is in equilibrium at a price of P1 and a quantity of Q1. What will happen to the equilibrium price and quantity in the market if the following four events were to occur? Treating each event separately, please draw an appropriate supply and demand diagram for each event illustrating the relationship between the initial equilibrium (P1, Q1) and the new equilibrium (P2, Q2). **Please explain each diagram** in a couple of sentences.

A) Southern California experiences unusually high temperatures, sending an unusually large number of people to its beaches.

B) The price of the epoxy paint used to coat surfboards increases.

C) To cover recent budget deficits, local governments in southern California began charging admission fees at all beaches.

D) Weather experts announce that next season is expected to bring a lot of bad weather.

Part E): New research has found that surfing has benefits not only for the surfer herself, but also for all those who come in contact with her. Everyone is happier, and their well-being is improved. If this proves to be true, would you argue that the private market for surfboards produces the socially optimal (i.e., the allocatively efficient) number of surfboards? Please explain and include a diagram as part of your explanation.

2. **Extra Credit**: Read the attached article on why gas prices are falling in the U.S. The author argues that the fall in gasoline prices can be explained in large part by the changing behavior of demand over time. We know from our "law of demand" when the price of a good increases, quantity demanded for the good decreases: i.e., the demand curve is downward-sloping. (We move up along a given demand curve as price changes.) The author argues that the shape of the demand curve will change over time because "people are relatively more responsive to price changes in the long run than in the short run." (Review determinants of demand elasticity in chapter 6.)

Illustrate a possible short-run demand curve for gasoline and a long-run demand curve for gasoline. Use your two diagrams to explain how changes in consumer behavior over time can help to explain the drop in gasoline prices in the face of continuing supply shortages, which have been in effect over the past two years due to the Ukrainian War. (Do not include the change in gov't policy in your analysis.)

Why Are Gas Prices Falling?

Does Biden deserve credit or does the second law of demand explain our less painful trips to the pump?

Wednesday, August 3, 2022

Peter Jacobsen

Anyone who has a car is breathing a sigh of relief this last week. After two years of increasing gas prices, we've finally had a significant fall in gas prices.

Gas prices are still high at $4.33/gall on (nearly double the $2.18 they were in July of 2020), but there appears to be light at the end of the tunnel.

Since the current administration has taken a great deal of heat over high fuel prices, perhaps it's no surprise to see the White House taking credit for the lower prices. Earlier this month, President Biden noted that gasoline prices had fallen for 30 consecutive days.

"Our actions are working, and prices are coming down," Biden said days later.

However, there is little evidence to indicate the majority of the price drop is due to any particular policy change.

This leaves us with an important question. Why exactly are prices falling?

Falling Demand?

Several outlets have undertaken the task of explaining this price decrease. Some seem to have arrived at an answer that is in the right direction.

An article on *MarketWatch* pinpoints the ultimate cause as falling demand. "Gasoline demand weakness against historical seasonal strength is pressing retail prices lower," MarketWatch reported analyst Brian Milne saying.

The New York Times reported a similar explanation:

> A report by ESAI Energy, an analytics firm, said on Wednesday that the firm expected a global surplus of four million barrels a day in the roughly 100-million-barrel-a-day market in the second quarter. "This is a significant drop in demand," said Sarah Emerson, ESAI president.

In other words, the oil purchasing decisions are falling below what the oil industry expected. Four million less barrels a day are being utilized than industry experts had anticipated. *The Times* continues:

> An Energy Department report released Wednesday showed that gasoline demand in recent weeks had dropped by 1.35 million barrels a day, or more than 10 percent. A recent survey from AAA seems to back this up, highlighting that two thirds of Americans have claimed to have changed their driving habits since the price increases.

So there's our answer, right? Falling demand means lower prices.

There are several problems with this explanation, but the problems manifest in one particular issue. Neither of these articles gives a satisfactory answer for *why* demand would be falling.

In order to understand why demand is changing we first need to eliminate a fallacious reason. It might be tempting to say demand is falling because the price is high. In fact, the *MarketWatch* article seems to suggest this explanation. But this claim is wrong.

It's true that when the price of gas (or any good or service for that matter) rises, people will purchase a smaller quantity of that good or serv ice. Economists call this the first law of demand.

But the key part of that statement is *when the price rises.* Higher prices have existed for a while and cannot explain *suddenly* lower quantity demanded. Why didn't the higher prices lead to a lower quantity demanded earlier?

In fact, committing to this explanation that higher price leads to lower demand is contradictory because it would be akin to saying "higher prices cause lower demand which causes lower prices." This circular reasoning is confusing and incomplete at best.

Scarcity + Time = Substitution

MarketWatch and *The New York Times* missed it by that much.

I believe the outlets are right to pinpoint changing demand as the relevant factor for falling prices, and they're right that higher prices are part of the story, but the explanation is missing the most important part.

To see what's really going on, consider an example.

Imagine you've booked your vacation for the summer and you've decided to do a cross-country trip in an RV. The RV is rented, you've put in for vacation days at work, the insurance is covered, you've paid for tickets for sights and attractions, and your family is packed and read y.

You go to bed and gas prices are $2/gallon. The next morning you pull into a gas station with the RV and the price has skyrocketed to $4/gallon. The cost of your travel has doubled.

Do you cancel? In some cases the answer could be yes, but for many people the higher cost of gas is less than the cost of planning an entirely new vacation and executing the plan within a day. The cost of doing the logistics of canceling bookings and organizing something to do with your vacation days is high on short notice.

Now imagine a different scenario. You're six months out from your trip and gas prices skyrocket to $4. You haven't rented an RV or put in for vacation days. You assume gas prices will stay high until your vac at io n. Do you change your vacation plans? It seems likely.

The answer isn't certain, but what we *can* say with certainty is that it's more likely that someone will change vacation plans in the second scenario with six months notice relative to the first scenario with no notice.

Why? Simply put, it's more costly to find substitutes in the short run than in the long run.

This illustrates a principle called *the second law* of *demand* which states that people are relatively more responsive to price changes in the long run than in the short run. Economists call this responsiveness "elasticity".

Or, as the late and great economist Walter Williams put it, "demand curves are relatively more elastic in the long run than in the short -run."

With this insight in hand, we are now equipped to give a more robust explanation for falling gas prices.

To begin, gas prices increase substantially. It's too costly for people to substitute their gas usage in the short run. You still need to drive to your vacation, work, or church the next day if gas prices go up. But, as more time passes, there is more ability to cheaply discover alternatives like bus routes, carpool situations, financing for electric cars, or telework options.

In the case of vacations you could substitute your RV trip with the "staycation" option, which is growing in popularity, given you have time to plan.

Then, as more people substitute these options for gas, gas stations face a new lower demand. Again, this doesn't occur immediately because it's costly to make these substitutions in the short run.

Admittedly, confirming this theory as the number-one cause of falling gas prices would require significant statistical work, but the theory is consistent with the basic facts of lower demand and the time that's passed since gas prices have risen.

Is it possible that releases of supply from the government's Strategic Petroleum Reserve have had some impact? It certainly should make some difference, but as the articles above indicate, the basic evidence seems to show demand changes are the driver here-not supply changes.

Even Biden's own Treasury Department estimates the US strategic reserve release to have impacted prices from 13 cents to 33 cents with a little more potentially due to international releases. This upper estimate, based on very generous assumptions, still leaves about half of the price drop unexplained.

And even without statistical testing, the second law of demand is an economic law which means it certainly plays some role in the more responsive demand, everything else held constant.

It's not clear that we're out of the woods on inflation yet. However, I remain confident that consumer-side substitutions and supplier-side innovations will continue to work to make gas prices more affordable- so long as meddlesome regulators stay out of the way.