

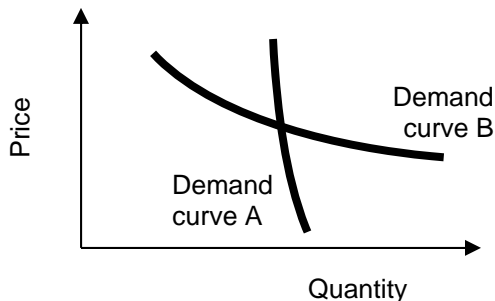
EXAMINATION 2 VERSION C
"Applications of Supply and Demand"
March 12, 2014

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Numerical answers, if rounded, must be correct to at least 3 significant digits. Point values for each question are noted in brackets. Maximum total points are 100.

I. Multiple choice: Please circle the one best answer to each question. [1 pts each, 13 pts total]

- (1) The units of measure for the price elasticity of demand for electricity are
- kilowatt-hours per dollar.
 - dollars per kilowatt-hour.
 - The elasticity is a pure number and has no units of measure.
 - percent.

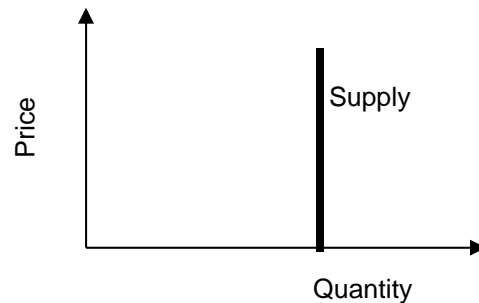
- (2) Which demand curve below is *less* elastic?
- Demand curve A.
 - Demand curve B.
 - Both have the same elasticity because they pass through the same point.
 - Cannot be determined from information given.



- (3) Suppose initially that in some city, the only way to obtain fast internet access is to purchase a DSL line from the telephone company. Then suppose the cable TV company begins offering internet access. This change will make the demand for DSL lines
- more elastic with respect to price.
 - less elastic with respect to price.
 - perfectly inelastic with respect to price.
 - Availability of substitutes does not affect elasticity.

- (4) If bagels and doughnuts are substitutes, then the cross-price elasticity of demand for doughnuts with respect to the price of bagels must be
- positive
 - negative.
 - zero.
 - cannot be determined from information given.

- (5) The supply curve in the graph below is
- unitary elastic.
 - perfectly elastic.
 - perfectly inelastic.
 - Cannot be determined from information given.



- (6) To pass the compensation test of Kaldor and Hicks, a change in the economy must result in
- cost savings for the government.
 - a rise in wages, salaries, and other compensation.
 - winners but no losers.
 - gains to winners that exceed any losses to losers.
 - at least some winners.

- (7) The price of rice is higher in Japan than in the United States. If the Japan ends its restrictions on international trade in rice, this change will benefit
- Japanese rice producers and U.S. rice consumers.
 - Japanese rice producers and Japanese rice consumers.
 - U.S. rice producers and U.S. rice consumers.
 - U.S. rice producers and Japanese rice consumers.

- (8) Arbitrageurs buy low and sell high because they want to
- enforce the Law of One Price.
 - keep markets orderly.
 - ensure that all consumers face a fair price.
 - make a profit.
 - All of the above.

- (9) Suppose the price of apples in Des Moines is \$2.00 per pound and the cost of shipping apples between Des Moines and Omaha is \$0.60 per pound. Markets are *out of equilibrium* if the price of apples in Omaha is
- \$1.10 per pound.
 - \$1.50 per pound.
 - \$1.90 per pound.
 - \$2.30 per pound.

- (10) Suppose the price of a share of stock in ABC Corporation today is \$100. Assume that speculators are already active in the stock market, and that the market is in *equilibrium*. Then speculators must believe that the price of a share of stock in ABC Corporation tomorrow will be
- about \$100.
 - greater than \$100.
 - less than \$100.
 - cannot be determined from information given.

- (11) A quota on *selling* ivory would cause the price of ivory to
- rise.
 - fall.
 - rise or fall, depending on the shapes of the demand and supply curves.
 - remain constant.

- (12) Suppose the price elasticity of supply for items sold on the internet in Iowa is 8.0 and the price elasticity of demand is -1.0. If Iowa imposes a tax on internet sales,
- Sellers will pay most of the tax.
 - Buyers will pay most of the tax.
 - Sellers and buyers will each pay half of the tax.
 - Answer depends on which side is legally required to remit the tax to the government.

- (13) A Laffer curve shows the relationship between
- quota quantities and quota price.
 - deadweight loss and tax rates.
 - quantity and price.
 - consumer surplus and price.
 - tax rates and tax revenues.

II. Problems: Insert your answer to each question in the box provided. Use margins and graphs for scratch work. Only the answers in the boxes will be graded. Work carefully—partial credit is not normally given for questions in this section.

(1) [Calculating elasticities: 2 pts] Suppose that if the price of ice cream is \$2 per gallon, the average household buys 11 gallons per year. If the price is \$4 per gallon, the average household buys 7 gallons per year. Compute the price elasticity of demand for ice cream using the “arc-elasticity” formula.

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(2) [Using price of demand: 10 pts] Suppose we want to reduce consumption of sugary drinks by 6 percent. Also suppose that the price elasticity of demand for sugary drinks is -1.2 .

- a. According to the information above, is demand for sugary drinks *elastic*, *inelastic*, or *unitary-elastic*?
- b. To reduce consumption of sugary drinks by the targeted amount, should the price *increase*, *decrease*, or remain *constant*?
- c. ... by approximately how much?
- d. Will total spending by consumers on sugary drinks *increase*, *decrease*, or remain *constant*?
- e. ... by approximately how much?

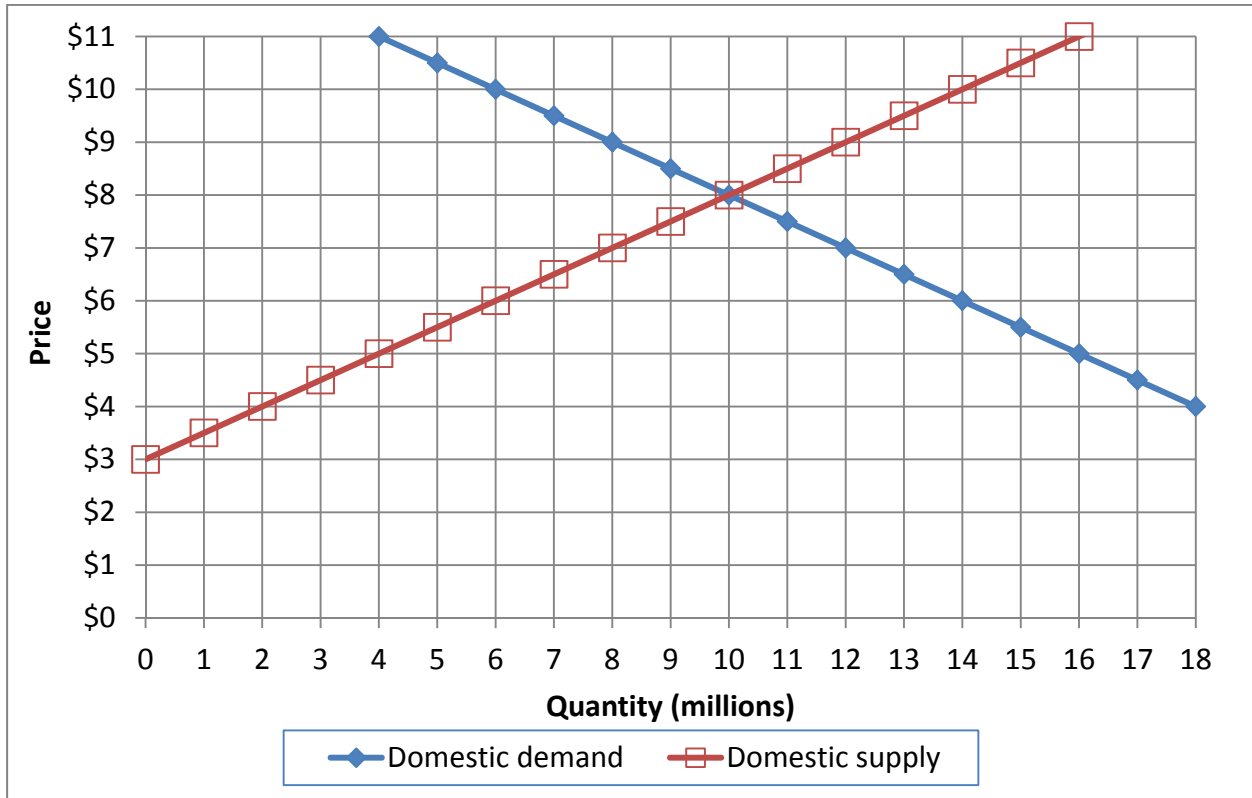
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(3) [Using income elasticities: 10 pts] Suppose the income elasticity of demand for electricity is 0.8. Now suppose consumers’ income *rises* by 5%. Assume the price of electricity does not change.

- a. According to the information above, is electricity a *necessary good*, an *inferior good*, or a *luxury (or superior) good*?
- b. As income rises, will the quantity of electricity demanded *increase*, *decrease*, or remain *constant*?
- c. ... by about how much?
- d. Will consumer spending on electricity, as a fraction of a consumer's total budget, *increase*, *decrease*, or remain *constant*?
- e. ... by about how much?

%
%

(4) [Welfare effects of international trade: 18 pts] Domestic supply and demand for hammers in a particular country are given by the following diagram.



a. At first, international trade in hammers is not permitted. Find the equilibrium price without international trade.

\$	
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Then this industry is opened to international trade and the international price of hammers turns out to be **\$ 6**.

b. Will this country now *export* or *import* hammers?

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c. How many?

million

d. Does consumer surplus in this country *increase* or *decrease* from international trade in hammers?

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e. By how much?

\$	million
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f. Does producer surplus in this country *increase* or *decrease* from international trade in hammers?

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g. By how much?

\$	million
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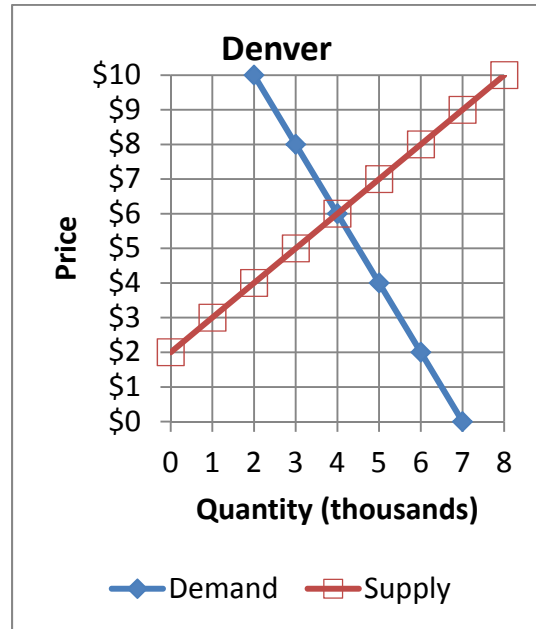
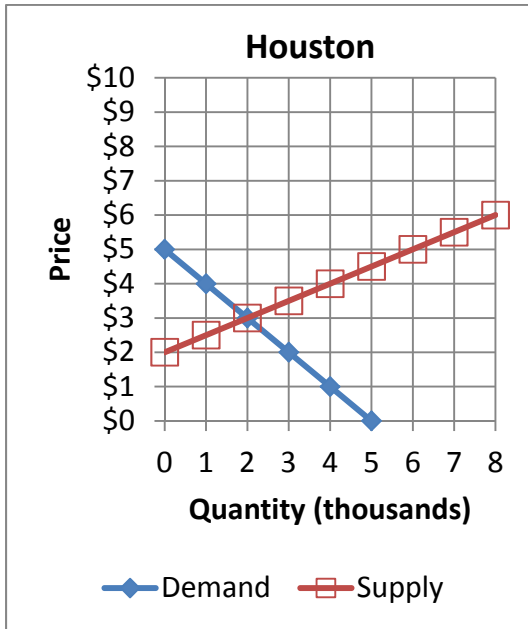
h. Does total social welfare in this country *increase* or *decrease* from international trade in hammers?

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i. By how much?

\$	million
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(5) [Arbitrage: 8 pts] The following graphs show markets for clock-radios in Houston and Denver, in the absence of any arbitrage activity.



Consider the effects of arbitrage.

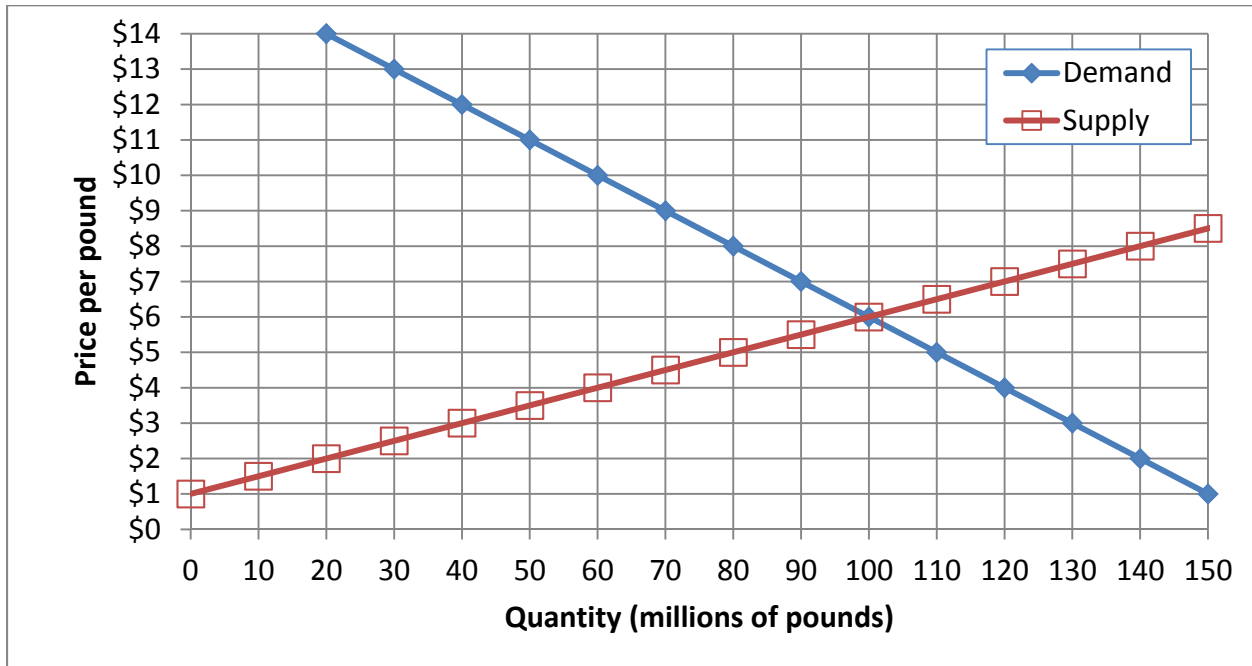
- a. [1 pt] In which city will the demand curve shift right—*Houston, Denver, both cities, or neither city*?
- b. [1 pt] In which city will the supply curve shift right—*Houston, Denver, both cities, or neither city*?

Suppose there are no costs of arbitrage. That is, the cost of moving clock-radios between these two cities is zero.

- c. [2 pts] By how much will these curves shift?
- e. [2 pts] In equilibrium, what will be the price of clock-radios in Houston?
- f. [2 pts] In equilibrium, what will be the price of clock-radios in Denver?

thousand
\$
\$

(6) [Welfare analysis of market controls: 18 pts] The following graph shows the market for cheese.



a. Find the equilibrium price without government intervention.

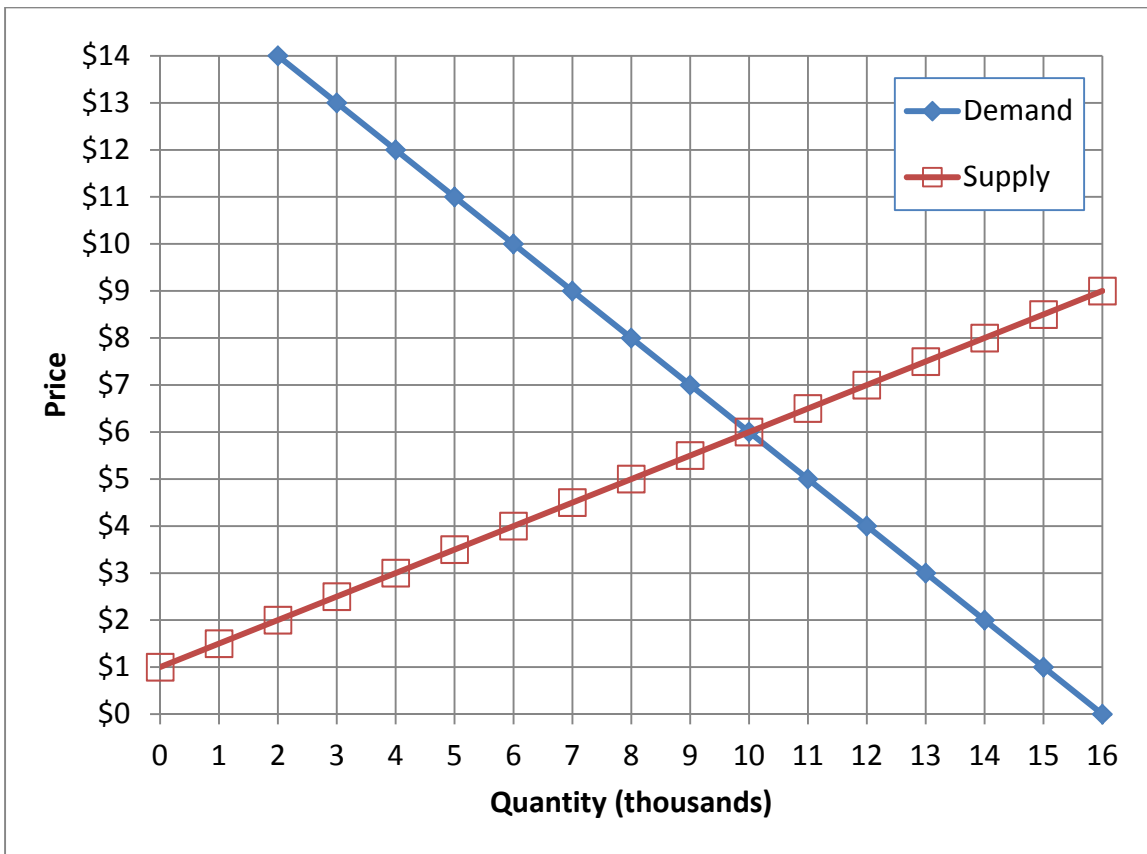
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Suppose the government imposes a quota (or legal maximum quantity) **on sellers of 40 million pounds**. Quota rights or permits to sell 40 million pounds of cheese are distributed to sellers for free. No one may sell cheese without a permit.

- b. Would this quota on sellers cause the price of cheese to *increase, decrease, or remain constant* ?
- c. Compute the new equilibrium price of cheese with the quota system on sellers.
- d. Does producer surplus *increase, decrease, or remain constant* because of the quota system, as compared to the market without government intervention? (Assume optimistically that quota rights to sell cheese are given to those cheese producers with the lowest cost.)
- e. By how much?
- f. Does consumer surplus *increase, decrease, or remain constant* because of the quota system, as compared to the market without government intervention?
- g. By how much?
- h. If cheese producers were allowed to buy or sell permits, in a “cap and trade” market, what would be the equilibrium **price of a permit** to sell one pound of cheese?
- i. Compute the deadweight social loss caused by the quota system.

\$	
\$	million
\$	million
\$	
\$	million

(7) [Welfare analysis of tax or subsidy: 18 pts] The graph below shows the market for tee-shirts.



Suppose the government imposes an excise **tax of \$ 3** per teeshirt.

- Compute the equilibrium quantity sold.
- Compute the equilibrium net price received by sellers (excluding the tax).
- Compute the equilibrium total price paid by buyers (including the tax).
- Does producer surplus *increase, decrease, or remain constant* because of the tax?
- By how much?
- Does consumer surplus *increase, decrease, or remain constant* because of the tax?
- By how much?
- Compute the total tax revenue collected by the government.
- Compute the deadweight social loss caused by the tax.

	thousand
\$	per teeshirt
\$	per teeshirt
\$	thousand
\$	thousand
\$	thousand
\$	thousand

III. Critical thinking: Write a one-paragraph essay answering one question below (your choice). [3 pts]

(1) A study¹ found that when tobacco cigarette prices increased by 10 percent, use of marijuana by young people *decreased* by about 12 percent. Does this indicate that marijuana and tobacco cigarettes are *substitutes* or *complements*? Why? Compute the cross-price elasticity of demand for marijuana with respect to the price of cigarettes for young people (note: the sign is important).

(2) Suppose a price ceiling were placed on infant formula, lowering the price. Would this help ensure that more babies had access to infant formula? Justify your answer with a supply-and-demand graph.

Please circle the question you are answering. Write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling.

[end of exam]

¹ Frank J. Chaloupka, Rosalie Liccardo Pacula, Matthew C. Farrelly, Lloyd D. Johnston, Patrick M. O'Malley, "Do Higher Cigarette Prices Encourage Youth to Use Marijuana?" NBER Working Paper No. 6939, February 1999.