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Where Do Rebounds Go?
Using Balls to Teach Price Elasticity of Demand

Motivation and interest are important determinants of academic performance (Becker, 1997). However, engaging and motivating students involves presenting the material in an active and inclusive way. To facilitate this, the current paper develops an in-class activity that simplifies the process of introducing one of the core, most important, and yet least-understood concepts in introductory economics: price elasticity of demand. It does so by relating the otherwise-abstract concept with the basic and familiar image of a bouncing ball. Specifically, we use a ball's bounce upon being dropped against the floor to visually demonstrate the increase in quantity demanded in response to a decline in the price of a good or service.

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1. Introduction

Principles of Microeconomics is a general education course at most higher education institutions. This designation generates two, very important implications. First, a significant number of students enrolled in these courses do not necessarily seek an economics degree. This distinction is key because, according to Shell and Soh (2013), students tend to put more effort and interest into courses that are directly linked to their major or minor fields of study. Second, students enrolled in introductory economics courses do not have similar quantitative skills and, in turn, face unique challenges in their understanding and application of economics concepts; algebra, graphing skills, and even prior calculus training are among the drivers behind concept comprehension and performance (Schuhmann, McGoldrick, & Burrus, 2005; Ballard & Johnson, 2004; and Anderson, Benjamin, & Fuss, 1994). In other words, some students can understand and apply economics concepts with little to no further assistance beyond a simple exposition while others require significant additional support. As instructors, we should therefore be aware of this and strive to motivate and stimulate students' interests by introducing concepts in a relatable, active, and student-oriented way.

Teaching methods that involve in-class demonstrations or experiments are common across different disciplines and educational stages. However, as commonplace as these methods may be, they are rather underutilized in college-level, introductory economics courses, while "chalk-and-talk" continues to remain the de-jure teaching approach within the field (Becker, 1997, Becker & Watts, 2001 and 2008, Watts & Schaur, 2011; and Sax, 1996). In this regard, Becker (1997) and Lang (2016), among others, encourage the use of alternative pedagogical approaches to "chalk-and-talk" (e.g., think-pair-share activities, cooperative problem solving, or minute papers). Holt (1999) goes further and emphasizes the effectiveness of games and in-class experiments, while Dickie (2006) and Emerson and Taylor (2004) suggest that, in some cases, these activities lead to an increase in scores on the Test of Understanding in College Economics (TUCE). However, while Watts and Schaur (2011) and Becker and Watts (2008) note an uptick in the use of classroom games and experiments in introductory economics courses, this increase is rather small.

This paper seeks to facilitate the use of in-class activities in introductory microeconomics by simplifying the process of introducing one of the simplest, most important, yet dreaded concepts in economics: price elasticity of demand. The activity presented here serves a dual purpose: (1) it relates the otherwise-abstract concept of price elasticity to the familiar image of a bouncing ball and (2) it is inclusive and motivational. To the best of our knowledge, Tierney (2016) is the only paper that facilitates the teaching of price elasticity of demand using an in-class activity. However, we build on his paper in four major ways. First, the demonstration introduced here makes use of three items (i.e., two balls of different levels of bounciness and a beanbag) to distinguish between relatively elastic, relatively inelastic, and perfectly inelastic responses as opposed to only elastic versus inelastic. Specifically, we use the bounce that a ball gets when dropped to the floor to visually describe the quantity response to a decline in price. As opposed to just a mathematical explanation, this simple demonstration is likely to create a long-lasting mental image of what price elasticity of demand is — all while making the lecture fun, interactive, and memorable. Second, the activity is inclusive as it involves both student volunteers and an active audience through the use of classroom response systems (e.g. iClickers). Third, the activity may be slightly modified to depict complementary, unrelated, and inferior goods when discussing the cross-price and income elasticity of demand. Fourth, we seek to enhance the activity's learning outcomes by complementing it with a set of follow up questions and tables that contain estimated price, cross-price, and income elasticity coefficients for an array of goods and services. The rest of the paper discusses the in-class activity, its design, and the materials needed.

2. Materials Used and the In-Class Activity

This experiment requires six student volunteers, two balls with different levels of bounciness (elasticity)[1], a beanbag, a twelve-foot twisted cotton rope of various colors, three letter-sized, labeled tags on a lanyard (e.g., relatively elastic, relatively inelastic, and perfectly inelastic), and an active audience. The materials chosen for this activity have two main characteristics. First, the selected balls exhibit different levels of springiness or bounciness and are easily identified by the audience, even in larger classrooms. Second, it is important to note that, while the two balls have different levels of bounciness, the beanbag does not bounce at all. This last characteristic is key because it makes possible the illustration of a perfectly inelastic response. In addition, the beanbag's lack of rebound serves an excellent reference point against which the rebounds of the two balls can be contrasted. Equally important is to acknowledge that the degree of bounciness depends on the surface on which the balls land. To facilitate the choice of balls, a summary of how high some of the most common types of balls bounce on soft and hard ground, when dropped vertically from a height of five feet is provided in Table 1.

Table 1 – Approximate Height of Ball Bounce by Surface Type (5-foot-drop)

Type of Ball	Carpet (inches)	Hard Ground (inches)
Racquet	45	48
Lacrosse	38	43
Tennis	36	39
Softball	26	24
Baseball	25	23
Stress ball	24	23
Golf ball	22	40
Ping pong ball	19	38
Marble	18	12
Pool Cue	18	31
Beanbag	0	0

The activity is easy to implement in any class size and takes approximately 10 to 15 minutes. Specifically, in small course settings, the experiment can be conducted by the instructor. However, in relatively large classes, students may be divided into smaller groups and teaching assistants can be delegated to conduct the experiment with each subgroup.

To start, the instructor should ask the class for six student volunteers. Five are to come to the front of the room while the sixth is to remain in the audience holding the three tags. Specifically, three students are to handle the balls and beanbag. The remaining two hold the rope at a height of 2.5 feet, parallel to the floor. While the rebounds of the two balls and the beanbag can easily be linked with different percent increases in quantity demanded, it is important to provide a visual representation of the percent decline in price. One easy and

[1] A suggested combination of balls, which vary significantly in their bounciness, includes a racquetball and a baseball. For more details, refer to Table 1.

recommended way to do this is to use the distance between the floor and the rope.[2] While making sure that the rest of the class observes, assign a ball or bean bag to each of the three students. Ask these students to raise the balls or beanbag up at the same distance from the floor (a distance of about 5-6 feet or shoulder height is preferable). Next, ask the three students to release the balls and bean bag simultaneously at the count of three. Repeat the exercise one ball at a time and once again simultaneously. Ask the audience about which object bounced above the rope line. Ask the audience to help the sixth student volunteer to distribute the "perfectly inelastic" tag. Repeat for the "relatively inelastic" and "relatively elastic" tags. Once the tags are assigned, ask each of the three volunteers to raise their hands and drop their objects once more.[3] As is, this demonstration is most useful after introducing the concept of price elasticity. However, it can be adjusted for prior use by relabeling the tags (e.g., elastic as responsive, inelastic as less responsive, and perfectly inelastic as unresponsive).

The main advantage of the activity introduced here rests with its simplicity. However, its unsophisticated nature may turn into a minor drawback if some students do not take it seriously (Tierney, 2016). Nevertheless, our own experiences together with those of other instructors show that the activity serves as a good complement to the lecture component. For instance, a comment from one of our colleagues expresses both its simplicity and effectiveness by stating: "After observing my students struggling to wrap their heads around the concept of elasticity, I decided to implement this experiment in my classes. The students were highly engaged and thoroughly enjoyed the activity. It was incredible to see how something so simple made such a difference in their understanding." Perhaps the activity's unsophisticated and familiar nature is precisely what makes it both engaging as well as appealing to students. Additionally, a one-question survey we conducted in our classes bolstered its importance revealing that two out of three students found that, in general, the activity is useful for demonstrating the concept of price elasticity.

3. Applications

To connect the activity with the concept of price elasticity of demand, in-class discussions may start from the idea that the two balls and the beanbag rebound differently when released from the same height – just as the quantity demanded for different goods and services increases more or less as a response to the same change in the price. As a follow-up exercise, the instructor may present a list of goods and services and ask students to match these with the different balls and beanbag in accordance to their quantity responsiveness to price changes (i.e. "price elasticity of demand").

[2] The added benefit of this approach is that the rope can be lowered (or raised) such that one ball rebounds above while the other rebounds below. This way, the activity can be carried out with any two balls as long as there is a notable difference in their degrees of bounciness.

[3] The demonstration may be conducted without the sixth volunteer and the tags. In this case, the instructor may simply poll the audience on which object can be associated with each type of elasticity using classroom response systems.

To aid with this, we provide a sample matching exercise at the end of the paper. The tables compiled by Gwartney, Stroup, Sobel and Macpherson (2011) and Nicholson and Snyder (2011) report estimated price elasticities of demand for a range of goods and services and represent excellent resources should instructors decide to create their own exercises. For convenience, we include these as Tables 2 and Table 3.[4]

Table 2 – Price Elasticity of Demand for Various Goods

INELASTIC		**APPROXIMATELY UNITARY**	
Salt	– 0.1	Movies	– 0.9
Matches	– 0.1	Housing, owner occupied, long run	– 1.2
Toothpicks	– 0.1	Shellfish, consumed at home	– 0.9
Airline travel, short run	– 0.1	Oysters, consumed at home	– 1.1
Gasoline, short run	– 0.2	Private education	– 1.1
Gasoline, long run	– 0.7	Tires, short run	– 0.9
Residential natural gas, short run	– 0.1	Tires, long run	– 1.2
Residential natural gas, long run	– 0.5	Radio and television receivers	– 1.2
Coffee	– 0.25	**ELASTIC**	
Fish (cod), consumed at home	– 0.5	Restaurant meals	– 2.3
Tobacco products, short run	– 0.45	Foreign travel, long run	– 4.0
Legal services, short run	– 0.4	Airline travel, long run	– 2.4
Physician services	– 0.6	Fresh green peas	– 2.8
Dental services	– 0.7	Automobiles, short run	– 1.2 to –1.5
Taxi, short run	– 0.6	Chevrolet automobiles	– 4.0
Automobiles, long run	– 0.2	Budweiser beer	– 4.2
Cigarette consumption, long run (Canada)	– 0.3	Fresh tomatoes	– 4.6
		Hospital care in California	– 4.8
		Busch beer	– 6.1

Source: Gwartney, Stroup, Sobel, & Macpherson (2011).

[4] Table 2 is from Exhibit 5 on page 157 in Gwartney et al. (2011). Panel A of Table 3 is from Table 7.3 on page 193 in Nicholson and Snyder (2012). We compile panel B and attach it to the rest of Table 3 in order to conserve space.

Table 3 – Price and Income Elasticity of Demand for Various Goods

Panel A		
	Price Elasticity	**Income Elasticity**
Food	– 0.21	+ 0.28
Medical services	– 0.18	+ 0.22
Rental Housing	– 0.18	+ 1.00
Owner-Occupied Housing	– 1.20	+ 1.20
Electricity	– 1.14	+ 0.61
Automobiles	– 1.20	+ 3.00
Gasoline	– 0.55	+ 1.60
Beer	– 0.26	+ 0.38
Wine	– 0.88	+ 0.97
Marijuana	– 1.50	0.00
Cigarettes	– 0.35	+ 0.50
Abortions	– 0.81	+ 0.79
Transatlantic air travel	– 1.30	+ 1.40
Imports	– 0.58	+ 2.73
Money	– 0.40	+ 1.00
Panel B		
Electricity[a]	–0.30	+ 2.45
Wine and Spirits[a]	–0.03	+ 2.46
Expenditures Abroad[a]	–2.12	+ 0.96
Bread and Cereals[a]	–0.46	– 0.52
Fish[a]	–0.23	– 0.33
Coal[a]	–2.18	– 1.09
Rail Travel[a]	–0.92	– 0.59
Wal–Mart's Products[b]		– 0.70

Panel A Source: Nicholson & Snyder (2012). Panel B Sources: [a]Deaton (1975) and [b]Basker, (2011)

Ideally, this task should facilitate the discovery of factors that determine the price elasticity of demand. To further this, we invite the reader to consult questions 2 through 10, located in Appendix A. As an alternative, the instructor may use a think-pair-share approach by asking pairs of students about how they would react to price increases that involve goods or services with (a) a relatively elastic demand (depicted by a relatively higher bounce) and (b) a relatively inelastic demand (depicted by a relatively lower bounce).

Lastly, the activity introduced here may serve as a memorable reference point when discussing the connection between the price elasticity of demand and total revenue or the government's approach to taxation.[5]

4. Extensions to Cross-Price and Income Elasticity of Demand

The activity is also useful for illustrating the concepts of cross-price and income elasticities of demand. However, it is worth acknowledging that the activity is constrained to depicting opposite changes or no changes in quantity demanded (i.e., ball/beanbag rebound) in response to declines in prices or income (i.e., the drop in the ball or beanbag). [6] Therefore, with minor changes (i.e., the tags and using only one ball and the beanbag), this activity can be used for demonstrating the response of quantity demanded to changes in the price of complementary and unrelated goods. For the latter pair of goods, the beanbag's use is imperative. This way, the beanbag's lack of rebound denotes the unchanging nature of quantity demanded (for, say, peanut butter) due to a drop in the price of an unrelated good (say, light bulbs). Conversely, the ball's rebound represents the increase in quantity demanded due to a drop in the price of a complementary good (say, jelly). Lastly, since elastic or inelastic responses are rarely emphasized when discussing the cross-price elasticity of demand, the rope is not needed anymore. With similar alterations, the activity may be applied to demonstrate how the quantity demanded responds to changes in income. However, given the constraint outlined above, only inferior goods may be portrayed this way. Despite these limitations, the activity's applications to cross-price and income elasticity of demand provide useful departure points into discovering other types of related goods such as substitutes or normal goods. For instance, once complementary, unrelated, or inferior goods are introduced, the instructor may follow up with a series of questions in order to guide the audience toward discovering the remaining substitute or normal goods.

To facilitate this process, we provide a list of follow up questions in Appendix A and discuss these below. For example, once the idea of complementary or unrelated goods is introduced, open-ended questions such as "What other kind of relationship may exist between two goods? What about Coke and Pepsi?" or matching exercises such as #11 should nudge students towards discovering the concept of substitutability. Classroom response systems, questions such as #12 or similar variations of it, and additional prompts like "What kind of relationship best describes the pairs of goods in answer choices a), b), and c)?" can be harnessed to reach the same outcome. The concept of substitutability between goods can be strengthened by revealing and discussing the relevant data in Table 4. This table may also be used to discuss whether two goods are complements, substitutes, or unrelated based on the sign of the cross-price elasticity of demand coefficient. Question 13 and exercise #14 serve as building blocks for a similar approach to discussing the concept of income elasticity of demand.

[5] For example, the instructor may remind the students that the demand is more or less responsive for different goods – just like the racquetball, baseball, and beanbag rebound differently when dropped from the same height. And, depending on the demand's responsiveness, total revenue may be increased by lowering or raising prices. In addition, a government may increase tax revenue while reducing the welfare loss by imposing a tax on goods or services with an inelastic demand or a relatively lower bounce. Once the bounce is referenced, the instructor may want to recall the matching exercise (i.e., goods with price elasticity of demand coefficients) introduced earlier and follow up with a question about why taxing goods with inelastic demand may result in a lower welfare loss.

[6] For the same reason, the activity is not as useful for illustrating the price elasticity of supply.

Table 4 – Cross-Price Elasticities of Demand for Various Goods

Good	Related Good #1	Cross-Price Elasticity of Demand	Related Good #2	Cross-Price Elasticity of Demand
Pepsi[a]	Coke	+ 0.250	Pepsi Diet	+1.300
Pepsi[a]	Mountain Dew	+ 0.480	A&W Root Beer	+0.690
Nestle Shredded Wheat[b]	Kellogg Frosted Mini Wheats	+ 0.033	General Mills Wheaties	+0.043
Post Raisin Bran[b]	General Mills Raisin Nut	+ 0.046	Post Honey Bunches of Oats	+0.024
Kellogg Cheerios[b]	General Mills Honey Nut Cheerios	+ 0.094	Post Honey Bunches of Oats	+0.171
Poultry[c]	Beef	+ 0.079	Pork	+0.076
Beef[c]	Poultry	+ 0.296	Pork	+0.217
Molson Light[d]	Coors Light	+ 1.213	Miller Lite	+0.893
All non-Domestic (U.S.) Vehicles[e]	Domestic (U.S.) Vehicles	+ 0.280		
All non-European Vehicles[e]	European Vehicles	+ 0.760		
Energy[f]	Labor	+ 0.680	Capital	– 3.530
Fresh Fish (Rural)[g]	Meat	– 0.609	Starches	– 0.265
Fresh Fish (Urban)[g]	Meat	+ 0.127	Starches	– 0.063
Entertainment[h]	Lodging	– 0.105		
Lodging[h]	Clothing	– 0.313		

Note: The table is based on our own survey of the literature. It presents a sample of estimated cross-price elasticity of demand coefficients for column goods (i.e., related goods #1 and #2) with respect to a one-percent increase in the price of row goods.

Sources: [a]Dube (2005). Figures refer to the U.S. between 1993 and 1995. [b]Nevo (2003). Figures denote the percent change in market share of the good given a one-percent change in the price of the related good and refer to the U.S. between 1988 and 1992; [c]Chavas (1983). Figures refer to the U.S. in 1979; [d]Hausman, Leonard, and Zona (1994). Figures refer to the U.S. for 16 years before 1994; [e]McCarthy (1996). Figures refer to the U.S in 1989; [f]Brendt, and Wood (1975). Figures refer to the U.S. manufacturing sector between 1947 and 1971; [g]Deaton (1987). Figures refer to Cote d'Ivoire in 1979; [h]Fuji, Khaled, and Mak (1985). Figures refer to Hawaii between 1958 and 1980.

5. Conclusion

A series of studies emphasize the learning benefits of classroom games, experiments, and activities in introductory economics courses and encourage the use of such pedagogical resources. We take on the challenges set by the papers in these two literature strands and provide a secondary approach to introducing price elasticity of demand. To the best of our knowledge, and despite being one of the most important concepts in economics, the concept of price elasticity benefits from only one such resource: Tierney (2016).

In this paper, we draw on the basic and familiar image of a bouncing ball as an alternative to the rubber bands used in Tierney (2016). This broadens the scope of the activity by depicting a wider spectrum of responses (i.e., perfectly inelastic, relatively inelastic, and relatively elastic) and emphasizes responsiveness as the fundamental feature underlying the concept of price elasticity; as balls of different rebounds are dropped from a given height. The setup introduced here is also useful for illustrating the idea of complementary, unrelated, and inferior goods when discussing cross-price and income elasticities of demand. Additionally, we supplement the activity with a set of resources (i.e., a wide array of estimated price, cross-price, and income elasticity coefficients and a set of follow-up questions) that the instructor may use to enhance and solidify the lessons brought forward by the activity. Last, but certainly not least, the activity engages and includes students in a simple, fun, and memorable way by drawing on both student volunteers and an active audience.

References

Anderson, G., Benjamin, D., & Fuss, M. A. 1994. The determinants of success in university introductory economics courses. *The Journal of Economic Education, 25*(2), 99-119.

Basker, E. 2011. Does Wal-Mart sell inferior goods? *Economic Inquiry, 49*(4), 973-981.

Ballard, C. L., & Johnson, M. F. 2004. Basic math skills and performance in an introductory economics class. *The Journal of Economic Education, 35*(1), 3-23.

Becker, William E. 1997. Teaching economics to undergraduates. *Journal of Economic Literature, 35*(3): 1347-1373.

Becker, W. E., & Watts, M. 2001. Teaching methods in U.S. undergraduate economics courses. *The Journal of Economic Education, 32*(3), 269-279.

Becker, W. E., & Watts, M. 2008. A little more than chalk and talk: Results from a third national survey of teaching methods in undergraduate economics courses. The Journal of Economic Education, *39*(3), 273-286.

Brendt, E. R., & Wood, D. O. 1975. Technology, prices, and the derived demand for energy. *The Review of Economics and Statistics, 57*(3), 259-268.

Chavas, J. P. 1983. Structural change in the demand for meat. A*merican Journal of Agricultural Economics, 65*(1), 148-153.

Deaton, A. 1975. The estimation of income and price elasticities. *The European Economic Review, 6*(2), 261-273.

Deaton, A. 1987. Estimation of own- and cross-price elasticities from household survey data. *Journal of Econometrics, 36*(1-2), 7-30.

Dickie, M. 2006. Do classroom experiments increase learning in introductory microeconomics? The Journal of Economic Education, *37*(3), 267-288.

Dube, J. P. 2005. Product differentiation and mergers in the carbonated soft drink industry. *Journal of Economics & Management Strategy, 14*(4), 879-904.

Emerson, T. L. N., & Taylor, B. A. 2004. Comparing student achievement across experimental and lecture-oriented sections of a principles of microeconomics course. *Southern Economic Journal, 70*(3), 672-693.

Fuji, E. T., Khaled, M., & Mak, J. 1985. An almost ideal demand system for visitor expenditures. *Journal of Transport Economics and Policy, 19*(2), 161-171.

Gwartney, J., Stroup, R., Sobel, R., & Macpherson, D. 2011. *Microeconomics: Public and private choice*. Mason, OH: Southwestern-Cengage Learning.

Hausman, J., Leonard, G., & Zona, D. J. 1994. Competitive analysis with differentiated products. *Annales d'Economie et Statistique/Econometrics of Imperfect Competition, 34*(Apr.-Jun.), 159-180.

Holt, C. A. 1999. Teaching economics with classroom experiments. *Southern Economics Journal, 65*(3), 603-610.

Lang, J. M. 2016. *Small teaching: Everyday lessons from the science of learning*. San Francisco, CA: Jossey-Bass.

McCarthy, P. S. 1996. Market price and income elasticities of new vehicle demands. *The Review of Economics and Statistics, 78*(3), 543-547.

Nevo, A. 2003. Measuring market power in the ready-to-eat cereal industry. *Econometrica, 69*(2), 307-342.

Nicholson, W., & Snyder, C. 2012. *Microeconomic theory: Basic principles and extensions.* Mason, OH: Southwestern-Cengage Learning.

Sax, L. J. 1996. *The American college teacher: National norms for the 1995-96 HERI faculty survey*. Los Angeles, CA: Higher Education Research Institute, University of California.

Schuhmann, P. W., McGoldrick, K. M., & Burrus. R. T. 2005. Student quantitative literacy: Importance, measurement, and correlation with economic literacy. *The American Economist, 49*(1), 49-65.

Shell, D. F., & Soh, L. K.. 2013. Profiles of motivated self-regulation in college computer science courses: Differences in major versus required non-majorcCourses. *Journal of Science Education and Technology, 22*(6), 899-913.

Tierney, J. 2016. Teaching price elasticity of demand with rubber bands. *Journal of Economic and Finance Education, 15*(3), 26-28.

Watts, M., & Schaur, G. 2011. Teaching and assessment methods in undergraduate economics: A fourth national quinquennial survey. *The Journal of Economic Education, 42*(3), 294-309.

Appendix A – Follow-up Questions and Exercises

Bloom's: Remember/AACSB: Reflective Thinking

1) Match the goods below with the appropriate price elasticity of demand coefficient. (The data is from Table 2.)

Cigarettes (baseball)	–0.3
Automobiles (racquetball)	–1.5
Chevrolet Automobiles (racquetball)	–4.0
Salt (beanbag)	–0.1

Bloom's: Analyze/AACSB: Analytic

2) The price elasticity of demand coefficient for Busch beer is – 6.1 whereas for Budweiser, the coefficient is – 4.2. The demand for Busch is more accurately depicted by the _____ while the demand for Budweiser is shown by the _____.

a) *racquetball; baseball*

b) baseball; racquetball

c) beanbag; racquetball

d) racquetball; beanbag

Bloom's: Analyze/AACSB: Analytic

3) Which of the answers below may denote one reason for which the demand for Busch beer is more elastic than that for Budweiser beer?

a) There are relatively more substitutes available for Busch beer.

b) *Consumers are relatively more loyal to Budweiser beer.*

c) Budweiser beer is more of a necessity in comparison to Busch beer.

d) Busch beer accounts for a relatively larger portion of one's budget than does Budweiser beer.

Bloom's: Remember/AACSB: Reflective Thinking

4) Consider the following three goods along with the associated price elasticity of demand coefficients in parentheses: Chevrolet automobiles (–4.0), restaurant meals (–2.3), and salt (–0.1). Which of the combinations below can be associated with the bounce of a racquetball, a baseball, and a beanbag, in this precise order?

a) salt, restaurant meals, Chevrolet automobiles

b) Chevrolet automobiles, restaurant meals, salt

c) restaurant meals, Chevrolet automobiles, salt

d) salt, Chevrolet automobiles, restaurant meals

e) None of the above.

Bloom's: Analyze/AACSB: Analytic

5) Why is the response of quantity demanded [to changes in price] for goods such as salt, matches, or toothpicks better characterized by the beanbag's rebound?

a) Each of these goods accounts for a low share in one's budget.

b) Each of these goods benefits from a large number of substitute goods.

c) Consumers' adjustments to changes in prices for such goods are more likely to occur in the short run as opposed to the long run.

For such goods, the percentage change in price is always lower than the percentage change in quantity demanded.

Bloom's: Remember/AACSB: Reflective Thinking

6) For automobiles, the response of quantity demanded to changes in price is charac terized by the baseball's rebound. For Chevrolet automobiles, the response is depicted by the racquetball's rebound. Which of the following most closely represents the price elasticity demand coefficient for automobiles (first number) and for Chevrolet automobiles (second number)?

a) –0.2; –4.0

b) close to zero; –1.0

c) –4.0; –1.0

d) –1.0; –0.8

Bloom's: Analyze/AACSB: Analytic

7) For automobiles, the price elasticity of demand coefficient is –0.2. For Chevrolet automobiles, the coefficient is –4. The demand for Chevrolet automobiles is more elastic than that for automobiles because _____.

a) Chevrolet automobiles represent a narrower category, with fewer substitute goods available.

b) automobiles represent a broader category, with fewer substitute goods available.

c) relative to automobiles, there are more substitute goods available for Chevrolet automobiles.

d) automobiles are a luxury as opposed to a necessity good.

e) both, b and c

Bloom's: Analyze/AACSB: Analytic

8) In the long run, the response of the quantity demanded of gasoline to changes in price is characterized by the baseball's rebound. In the short run, the response is depicted by the beanbag's rebound. The price elasticity of demand coefficient for gasoline is _____ in the long run and _____ in the short run.

a) –0.7; close to zero

b) close to zero; –0.7

c) –1.5; close to zero

d) close to zero; –1.5

Bloom's: Analyze/AACSB: Analytic

9) In the long run, the price elasticity demand coefficient for gasoline is –0.7 whereas in the short run, the coefficient is –0.2. The demand for gasoline is more elastic in the long run because

a) it is easier to store gasoline in the short run.

b) more substitutes are available in the long run as opposed to the short run.

c) consumers' adjustments to changes in the price of gasoline are more likely to occur in the long run as opposed to the short run.

d) all of the above

e) both b and c

Bloom's: Remember/AACSB: Reflective Thinking

10) Given a decline in price, which of the combinations below best describes the response of quantity demanded for necessity and luxury goods?

a) racquetball and baseball

b) baseball and racquetball

c) beanbag and racquetball

d) Both b and c

Bloom's: Remember/AACSB: Reflective Thinking

11) Match the pairs of goods below with the appropriate cross-price elasticity of demand coefficient. Recall that the cross-price elasticity of demand coefficient denotes the percentage change in the quantity demanded of the second good given a one-percent increase in the price of the first good. (The data is from Table 4.)

Pepsi and Coke	+0.250
Fresh fish and starches (rural)	–0.265
Entertainment and lodging	–0.105
Energy and capital (as factors of production)	–3.530

Bloom's: Remember/AACSB: Reflective Thinking

12) Which of the following pairs of goods/services are complements?

a) Kellogg's Corn Flakes and Kellogg's Rice Krispies

b) Foreign and domestic automobiles

c) Coke and Pepsi

d) None of the above

Bloom's: Remember/AACSB: Reflective Thinking

13) For which of the goods below is the response of quantity demanded [to a change in income] depicted by the racquetball's rebound?

a) Wine and spirits

b) Coal

c) Rail travel

d) Electricity

e)Both b and c

Bloom's: Remember/AACSB: Reflective Thinking

14) Match the goods below with the appropriate income elasticity of demand coefficient. Recall that the income elasticity of demand coefficient denotes the percentage change in the quantity demanded of the listed goods given a one-percent increase in income. (The data is from Table 3.)

Bread and cereals	–0.520
Coal	–0.109
Rail travel	–0.590
Expenditures abroad	+0.96