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A note on teaching externalities: Distinguishing between consumption and production externalities

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ABSTRACT

The vast majority of microeconomics textbooks present production externalities as negative and consumption externalities as positive. Yet, both producers and consumers can cause positive and negative externalities. By discussing all four cases of externalities and separating the price effects for buyers and sellers, authors would offer a much clearer exposition of externalities and help resolve the misconception that negative externalities lead to prices that are too low.

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1. Introduction

Textbooks for introductory microeconomics courses are effective when they are simple and comprehensible. Simplification can enhance clarity but also risks limiting understanding of fundamental concepts. Over-simplification of economic concepts can lead to misconceptions and confusion. The coverage of externalities in most introductory microeconomics texts is over-simplified contributing to such misconceptions. The most common problem with textbook presentation of externalities is the focus on negative production externalities and positive consumption externalities. As a result, many students erroneously conclude that negative externalities are caused by producers and lead to prices that are too low.

I became aware of this problem while advising two students working on research projects related to small-diameter timber harvesting in Oregon and Montana. Small-diameter timber is used to produce bio-fuels and other products such as window frames. Both students argued that there was a positive externality associated with harvesting small-diameter timber because it provided services to the greater community through fire-suppression and enhanced recreational opportunities. Given the typical presentation of the positive consumption externality in many courses and textbooks, the

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students correctly concluded that too little small-diameter timber is harvested but incorrectly concluded that the market price was too low. In fact the price buyers pay for goods with positive externalities is too high relative to the optimum.¹ Omitting positive production externalities and negative consumption externalities is affecting students' ability to think through and model these concepts in their original research. Some textbooks not only limit their coverage of externalities but also misrepresent production externalities as consumption externalities and vice versa.

Externalities are an important part of introductory economics courses and are fundamental to environmental economics. While most textbooks make an effort to model both negative and positive externalities, many textbooks lack an explicit and separate modeling of production and consumption externalities.² Gans et al. (2012) stands in contrast with the rest of the textbooks by explicitly discussing consumption and production externalities and presenting three of the four cases. Because they do not provide an example of a positive production externality their coverage of externalities may still lead one to conclude that producers cannot cause positive externalities. Some textbooks suggest subtly that there are production and consumption externalities (e.g., Mankiw, 2012; Hubbard and O'Brien, 2011; Sexton, 2013), and others are more explicit (e.g., Bade and Parkin, 2011; Nechyba, 2010).^{3,4} However, none of the current texts I have examined explicitly model all four externality types. The standard coverage of externalities might imply that consumers do not cause negative externalities or that producers do not cause positive externalities.

A separate coverage of production and consumption externalities in introductory texts provides a better foundation for students confronted with externalities in more advanced economics courses and research. Explicitly discussing all four types of externalities provides the full toolkit needed to analyze the effects of externalities on the prices buyers pay and the prices sellers receive.

2. Problems with current coverage of externalities

The standard coverage of externalities in introductory texts has led many students and some educators to conclude that positive externalities should always be modeled as consumption externalities and negative externalities as production externalities. While the solutions and the effects on quantity are the same, the effects on market prices are different depending on which side of the market causes the externality or whether we are talking about buyers' price or sellers' price.

Evidence of this problem can be found in textbooks that erroneously conclude that both negative and positive externalities cause market prices to be too low.⁵ Other textbooks make that erroneous statement with respect to just negative externalities.⁶ While McConnell et al. (2011, pp. 105–106) do not discuss the price effects of externalities, they claim that negative externalities cause supply-side and positive externalities cause demand-side market failures. These textbooks show that oversimplification of externalities has also caused confusion among professional economists.

Furthermore, some texts misleadingly represent consumption externalities as production externalities and vice versa. For example, Klein and Bauman (2010) show a picture of a gasoline

¹ Only in a borderline case with a perfectly elastic demand curve could the price buyers pay equal the optimum price.

² See for example Arnold (2011), Bernheim and Whinston (2008), Boyes and Melvin (2011), Browning and Zupan (2012), Colander (2006), Cowen and Tabarrok (2010), Frank and Bernanke (2012), Gottheil (2009), Gwartney et al. (2013), Hall and Lieberman (2010), Holt (2010), Hubbard and O'Brien (2011), Mankiw (2012), McEachern (2012), Nechyba (2010), Sexton (2013), Stiglitz and Walsh (2006), Stone (2012), Taylor and Weerapana (2012), Tucker (2011). Case et al. (2009) explicitly model just the negative production externalities. Krugman and Wells (2013) model the markets for environmental bads (pollution) and environmental goods (land preservation) directly rather than goods with externalities.

³ In the instructor's manual accompanying Mankiw's 4th edition textbook, Ghent (2007) does offer an example of a negative consumption externality with an exercise related to alcohol consumption. Although a more recent instructor's manual accompanying Mankiw (2012), Ghent (2012) shows the negative consumption externality related to alcohol market as a production externality.

⁴ While Bade and Parkin mention all four types of externalities, they model only the standard two. Bade and Parkin also show the common resources problem that could easily be defined as a negative consumption externality problem, yet the authors do not draw this parallel.

⁵ For example, Bernheim and Whinston (2008, pp. 256–261), Colander (2006, pp. 424–425), Miller (2010, p. 111), and Pindyck and Rubinfeld (2013, pp. 663–665).

⁶ Frank and Bernanke (2012, p. 323), Gottheil (2009, p. 342), Guell (2010, p. 241), Schotter (2009, p. 611), Stone (2012, p. 323) and Tucker (2011, Ch. 14).

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