

## Teaching and Educational Methods

# Using Music to Teach Agricultural, Applied, and Environmental Economics

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### Abstract

Education scholars (Brewer 1995; Jensen 2000) have long known that using music to teach can improve learning. In this article, we discuss songs that educators can use to teach agricultural, applied, and environmental economics topics. We also show how educators can easily and freely access these songs and suggest strategies for including them when teaching.

## 1 Introduction

Economics has a history of being taught using “chalk-and-talk” techniques. In recent years, however, many economists have highlighted the use of media to help educate students (Becker and Watts 1996, 2001; Becker, Becker, and Watts 2006; Watts and Schaur 2011; Ongeru 2017; Picault 2019). Examples of alternative media include historical novels (Cotti and Johnson 2012), works of art (Watts and Christopher 2012; Al-Bahrani et al. 2016), movies (Mateer and Stephenson 2011; Mateer, O’Roark, and Holder 2016), television series (Hall 2005; Gillis and Hall 2010; Ghent, Grant, and Lesica 2011; Kuester, Mateer, and Youderian 2014; Patel et al. 2014; Tierney et al. 2015; Wooten and Staub 2017; Wooten, J., K. Staub, and S. Reilly. 2018; Muchiri, Paraschiv, and Wooten 2020; Wooten, Geerling, and Calma 2020; Geerling et al. 2021), and social media (Al-Bahrani and Patel 2015). Picault (2021) highlights the many ways economists have integrated projects where students create media.

By incorporating media, educators are attempting to better reach students. Research—along with anecdotal evidence from educators—shows us that students have different learning styles (Hawk and Shah 2007; Schmeck 2013). Incorporating media is a way to be a more inclusive teacher and for the economics profession to broaden its appeal to diverse populations (Lage, Platt, and Treglia 2000; Steele 2011). By incorporating different media, educators can better engage a wider percentage of their students.

Perhaps more than other media—the use of music might be a highly effective medium for teaching economic concepts, as students can relate to songs and often spend time memorizing lyrics. Students are also more likely to discuss economics outside of class when the lesson is contained in a song, finding that learning economics through music can be enjoyable. There is vast literature on music’s impact on both cognition and mood (e.g., see Stratton and Zalanowski 1991). Playing music before or during class can assist in classroom engagement and improving students’ attitudes regarding a class. Not only is music effective in improving cognition—some research shows it to be more effective than other alternative instruction methods (Standley 1996).

Tinari and Khandke (2000) published the first scholarly economics paper on the benefits of using music to teach. Since Tinari and Khandke’s paper, many others have illustrated the benefits of using music to teach economics. These include general papers helping to convince the profession that music can and should be used to teach economics, like those by Mateer and Rice (2007); Hall, Lawson, and Mateer (2008a); and Holder, Mateer, and O’Roark (2016). Other authors examine how to use specific songs or song genres to teach. For example, see Krasnozhon (2013), Melichar (2018), and Rousu (2018a).

And finally, there are scholarly papers that examine how to use songs to teach topics within economics, like those by Hall et al. (2008b), Hall and Lawson (2008), Raehsler (2013), Van Horn and Van Horn (2013), and Rousu (2018b). None of these papers/books have focused on teaching agricultural, applied, and environmental economics courses, however.

In this paper, we present songs that can be used to teach applied economics topics. We provide details on how to use songs to teach various topics in agricultural, applied, and environmental economics. In addition to an in-depth discussion of a selection of songs, we provide a table listing these and ninety-seven additional songs that can also be used in teaching economics. All songs discussed in this paper can be found on public websites and can be accessed, for free, by educators.<sup>1</sup> Our table with one hundred and seven songs is formatted by going chapter-by-chapter through a popular agricultural economics textbook, *Principles of Agricultural Economics* (Barkley and Barkley 2020) and indicates songs to use to cover specific topics for ease of implementation.

## 2 How to Use Music to Teach

There are several ways educators can implement songs into their teaching to become more effective. Educators could play a song prior to the beginning of class, with the song ending at about the time class starts. This is a low-cost way to introduce music as it takes no class time, and students get the benefit of additional content when they arrive early and wait for classes to begin. It also can help set up the daily lesson. This method might provide the lowest benefits, however, as it won't benefit students who do not arrive early.

Another option is to occasionally play a song mid-lesson, to reinforce a particular topic and to recapture students' attention. This allows educators to reach all students in a class and could be incorporated as a pedagogical strategy to take a break from a lecture or discussion; however, it is costlier given the opportunity cost of the in-class instruction time.

A third option is to assign students an assignment of listening to a song and to explain how it relates to the coursework. This could be as simple as describing how the lyrics represent the economic concept or theory or could be more involved and require students to collect data, make calculations, and analyze the results more thoroughly.

Various methods of formative assessment can then be used to ensure that students are comprehending the material. In the appendices, we present four lesson plans educators can use to integrate music into their lessons. These lesson plans cover agribusiness and the shut down rule (Appendix 1), international trade (Appendix 2), the production possibilities frontier (Appendix 3), and public goods (Appendix 4).

A low-cost way to increase student engagement is through a Think, Pair, Share approach. This method can be used in classrooms of varying size, but may be best suited for large lecture halls or breakout rooms in online learning environments. Students form small groups (2–3 students) and discuss questions posed by the professor. The professor can then randomly call on the groups for their response. Classroom polling can be a good way to gauge student comprehension and is relatively easy to implement. Professors can create multiple choice questions, true/false, word clouds, or other options. Various learning management systems and platforms include these options, including Poll Everywhere, Kahoot!, and Top Hat.<sup>2</sup>

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<sup>1</sup> For songs we discuss in great detail, only two have been presented in previous papers (to our knowledge); however, we discuss them in a different manner. The table at the end will include the ten songs from this paper's discussion as well as ninety-seven others, several covered in previous papers. This is done to make it easier for educators to find songs for teaching these topics. Of course, we cite the original paper that highlighted how the song can be used to teach economics so interested readers can read and learn more.

<sup>2</sup> These sites can be accessed at [polleverywhere.com](https://polleverywhere.com), [kahoot.com](https://kahoot.com), and [tophat.com](https://tophat.com).

Regardless of the method used, incorporating music into lessons on agricultural, applied, and environmental economics can yield large benefits. Students come to classes with different learning styles, and using music can help educators reach students that may struggle with traditional chalk-and-talk techniques. For students who learn well with chalk-and-talk, reinforcing concepts through music can still improve their learning by keeping them engaged and thinking about economics outside of the classroom.

### 3 Where Can You Access Songs?

In Table 1 we present a list of songs that can be used to teach. This table presents the song’s title, artist, and the specific topics the song covers. We also have a column illustrating the chapter in Barkley and Barkley’s (2020) textbook, *Principles of Agricultural Economics*, where we think the song could be used. This should make it easy for instructors using this textbook, or any agricultural economics textbook, to always have access to songs that cover common topics addressed.

In addition to Table 1, we want to outline six general sources where you can find most of the songs discussed in this paper. All six sites fall under the Educational Fair Use laws, where media can be used for educational purposes so long as the sites are not monetized, and there is a clear description of the educational purpose of the song. Each song also displays the lyrics as it plays, to ensure accessibility for students who have hearing difficulties.

**Table 1. Song List for use in Agricultural, Applied and Environmental Economics Courses**

| Song No. | Title                      | Artist              | Book Chapter                | Song Topics Covered   | Source                             |
|----------|----------------------------|---------------------|-----------------------------|---|------------------------------------|
| 1        | Dear Sweet Sewing Machine+ | Fiddler on the Roof | The Economics of Production | Economic growth, factors of production, PPF                                 | <a href="#">Broadway Economics</a> |
| 2        | In Color                   | Jamey Johnson       | The Economics of Production | Great Depression, technological advances with production                    | <a href="#">EconGoneCountry</a>    |
| 3        | Stress                     | Big Jim’s Ego       | The Economics of Production | Diminishing marginal utility, productivity, costs                           | <a href="#">Critical Commons</a>   |
| 4        | Trouble in the Fields**    | Nanci Griffith      | The Economics of Production | Great Depression, 1980s Farm Crisis, factors of production, technology, PPF | <a href="#">EconGoneCountry</a>    |
| 5        | 10,000 Hours               | Dan + Shay          | The Costs of Production     | Marginal cost/benefit   | <a href="#">EconGoneCountry</a>    |
| 6        | Ain’t Worth the Whiskey    | Cole Swindell       | The Costs of Production     | Opportunity cost, tradeoffs   | <a href="#">EconGoneCountry</a>    |

**Table 1 continued.**

|    |                          |                      |                         |  |                                    |
|----|--------------------------|----------------------|-------------------------|--|------------------------------------|
| 7  | Amish Paradise           | Weird Al Yankovic    | The Costs of Production | Opportunity costs, inefficiency, exchanges with the modern world, lack of technology, and meaning of a Robinson Crusoe economy | <a href="#">Critical Commons</a>   |
| 8  | Beer or Gasoline         | Chris Young          | The Costs of Production | Opportunity cost, tradeoffs, money, medium of exchange, unit of account  | <a href="#">EconGoneCountry</a>    |
| 9  | Chillin' It              | Cole Swindel         | The Costs of Production | Opportunity cost   | <a href="#">EconGoneCountry</a>    |
| 10 | Diamonds and Gasoline    | Turnpike Troubadours | The Costs of Production | Opportunity cost, tradeoffs  | <a href="#">EconGoneCountry</a>    |
| 11 | Five More Minutes        | Scotty McCreery      | The Costs of Production | Marginal cost/benefit  | <a href="#">EconGoneCountry</a>    |
| 12 | I'm Gonna Miss Her       | Brad Paisley         | The Costs of Production | Opportunity cost, tradeoffs  | <a href="#">EconGoneCountry</a>    |
| 13 | Leave the Night On       | Sam Hunt             | The Costs of Production | Marginal cost/benefit  | <a href="#">EconGoneCountry</a>    |
| 14 | Let it Go+               | Frozen               | The Costs of Production | Sunk costs   | <a href="#">Broadway Economics</a> |
| 15 | Love or Money            | Sammy Hagar          | The Costs of Production | Opportunity cost, cost of international trade, currencies  | <a href="#">YouTube</a>            |
| 16 | Poker Face               | Lady GaGa            | The Costs of Production | Risk and reward tradeoff   | <a href="#">Music4Econ</a>         |
| 17 | Right Where I Need to Be | Gary Allan           | The Costs of Production | Opportunity cost, tradeoffs  | <a href="#">EconGoneCountry</a>    |
| 18 | Summertime Blues         | Alan Jackson         | The Costs of Production | Opportunity cost, tradeoffs  | <a href="#">EconGoneCountry</a>    |
| 19 | Think a Little Less      | Michael Ray          | The Costs of Production | Marginal cost/benefit  | <a href="#">EconGoneCountry</a>    |
| 20 | Time Is Love             | Josh Turner          | The Costs of Production | Opportunity cost   | <a href="#">EconGoneCountry</a>    |
| 21 | Wasted Time              | Keith Urban          | The Costs of Production | Opportunity cost   | <a href="#">EconGoneCountry</a>    |

**Table 1 Continued.**

|    |  |               |                         |  |                                    |
|----|--|---------------|-------------------------|--|------------------------------------|
| 22 | Hippies and Cowboys                        | Cody Jinks    | Profit Maximization     | Opposite of profit maximization; determinants of demand (tastes and preferences, inferior goods) | <a href="#">EconGoneCountry</a>    |
| 23 | I Wish Grandpas Never Died                 | Riley Green   | Profit Maximization     | Profit maximization, economies of scale  | <a href="#">EconGoneCountry</a>    |
| 24 | Keep Your Eye on the Money                 | Motley Crue   | Profit Maximization     | Minimizing cost, maximizing profit   | <a href="#">YouTube</a>            |
| 25 | \$ave Dat Money                            | Lil Dicky     | Optimal Input Selection | Optimal input selection, unnecessary expenditures  | <a href="#">Econ.Video</a>         |
| 26 | Easy Money                                 | Brad Paisley  | Optimal Input Selection | Productivity and earnings, value of time   | <a href="#">EconGoneCountry</a>    |
| 27 | If You've Got the Money, I've Got the Time | Willie Nelson | Optimal Input Selection | Time as an input, value of time  | <a href="#">YouTube</a>            |
| 28 | Rain Is a Good Thing                       | Luke Bryan    | Optimal Input Selection | Production, resources, inputs, specialization, comparative advantage                             | <a href="#">EconGoneCountry</a>    |
| 29 | Shiftwork                                  | Kenny Chesney | Optimal Input Selection | Productivity and earnings, value of time   | <a href="#">EconGoneCountry</a>    |
| 30 | Sittin on the Dock of the Bay              | Otis Redding  | Optimal Input Selection | Productivity, resource use   | <a href="#">Critical Commons</a>   |
| 31 | Spoonful of Sugar                          | Mary Poppins  | Optimal Input Selection | Optimal input selection  | <a href="#">Broadway Economics</a> |
| 32 | Break Up with Him                          | Old Dominion  | Consumer Choices        | Sunk costs, status quo bias, rationality   | <a href="#">Music4Econ</a>         |
| 33 | Gone Country                               | Alan Jackson  | Consumer Choices        | Free markets, consumer preferences   | <a href="#">EconGoneCountry</a>    |

**Table 1 continued.**

|    |                             |                         |                  |   |                                    |
|----|-----------------------------|-------------------------|------------------|---|------------------------------------|
| 34 | I Want It That Way          | Backstreet Boys         | Consumer Choices | Wants, resource allocation, constraints, maximizing utility   | <a href="#">Broadway Economics</a> |
| 35 | Kill This Love              | BLACKPINK               | Consumer Choices | Sunk costs, loss aversion, preferences, marginal cost, marginal benefit                                   | <a href="#">Music4Econ</a>         |
| 36 | Little Bit of Everything    | Keith Urban             | Consumer Choices | Consumer preferences, diminishing marginal utility  | <a href="#">EconGoneCountry</a>    |
| 37 | More and More               | Twice                   | Consumer Choices | Maximize utility, limited resources, budget constraints, indifference curve, diminishing marginal utility | <a href="#">Music4Econ</a>         |
| 38 | Mr. Brightside              | The Killers             | Consumer Choices | Behavioral-econ, bounded rationality, loss aversion   | <a href="#">Critical Commons</a>   |
| 39 | Playinwitme (feat. Kehlani) | Kyle                    | Consumer Choices | Behavioral-econ, bounded rationality, loss aversion, sunk costs   | <a href="#">Econ.Video</a>         |
| 40 | Another Day of Sun+         | La Land                 | Supply           | Demand and supply, land prices  | <a href="#">Broadway Economics</a> |
| 41 | Blankets and Bedding        | Come From Away          | Supply           | Demand and supply   | <a href="#">Broadway Economics</a> |
| 42 | Irreplaceable*,##           | Beyoncé                 | Supply           | Elasticity of demand and supply, scarcity   | <a href="#">YouTube</a>            |
| 43 | Short Supply                | Tracy Chapman           | Supply           | Supply, shortages   | <a href="#">YouTube</a>            |
| 44 | You Make My Dreams          | Daryl Hall & John Oates | Supply           | Demand and supply   | <a href="#">YouTube</a>            |
| 45 | Alright                     | Darius Rucker           | Demand           | Inferior goods  | <a href="#">EconGoneCountry</a>    |

**Table 1 continued.**

|    |                                 |                           |         |   |                                  |
|----|---------------------------------|---------------------------|---------|---|----------------------------------|
| 46 | American Kids                   | Kenny Chesney             | Demand  | Complimentary goods   | <a href="#">EconGoneCountry</a>  |
| 47 | Champagne Night                 | Lady A                    | Demand  | Determinants of demand, normal goods, inferior goods, inflation, nominal vs. real | <a href="#">EconGoneCountry</a>  |
| 48 | Fix a Drink                     | Chris Janson              | Demand  | Complements   | <a href="#">EconGoneCountry</a>  |
| 49 | For a Boat                      | Luke Bryan                | Demand  | Money, scarcity, value, medium of exchange, leisure, normal goods                 | <a href="#">EconGoneCountry</a>  |
| 50 | I Hold On                       | Dierks Bentley            | Demand  | Demand, income, normal goods  | <a href="#">EconGoneCountry</a>  |
| 51 | I Want it All                   | Queen                     | Demand  | Demand, wants   | <a href="#">YouTube</a>          |
| 52 | If I Die Young                  | The Band Perry            | Demand  | Tastes and preferences, price   | <a href="#">EconGoneCountry</a>  |
| 53 | If I Had a Million Dollars      | The Barenaked Ladies      | Demand  | Normal goods, inferior goods  | <a href="#">Econ.Video</a>       |
| 54 | Parachute                       | Chris Stapelton           | Demand  | Elasticity of demand  | <a href="#">EconGoneCountry</a>  |
| 55 | Rich                            | Maren Morris              | Demand  | Determinants of demand, income, normal goods, inferior goods                      | <a href="#">EconGoneCountry</a>  |
| 56 | She Only Smokes When She Drinks | Joe Nichols               | Demand  | Demand, complements   | <a href="#">EconGoneCountry</a>  |
| 57 | Sucker                          | Jonas Brothers            | Demand  | Inelastic demand,   | <a href="#">Critical Commons</a> |
| 58 | Wing\$                          | Macklemore and Ryan Lewis | Demand  | Increases in demand, differentiation, cycle of consumption                        | <a href="#">Music4Econ</a>       |
| 59 | A Country Boy Can Survive       | Hank Williams, Jr.        | Markets | Interest rates, stock market  | <a href="#">YouTube</a>          |
| 60 | Big Money                       | Garth Brooks              | Markets | Labor market, compensating wage differentials                                     | <a href="#">Music4Econ</a>       |

**Table 1 Continued.**

|    |                              |  |                     |   |                                    |
|----|------------------------------|--|---------------------|---|------------------------------------|
| 61 | Country Boy                  | Aaron Lewis                                  | Markets             | Free markets, laissez-faire   | <a href="#">EconGoneCountry</a>    |
| 62 | eBay*                        | Weird Al Yankovic                            | Markets             | Consumer surplus, demand, equilibrium price, markets, producer surplus, supply, willingness to pay, willingness to sell | <a href="#">YouTube</a>            |
| 63 | Give Them What They Want+    | Dirty Rotten Scoundrels                      | Markets             | Competition, markets, demand and supply   | <a href="#">Broadway Economics</a> |
| 64 | Keep the Wolves Away         | Uncle Lucius                                 | Markets             | Market failure, negative externalities, pollution   | <a href="#">EconGoneCountry</a>    |
| 65 | Let the Dollar Circulate     | Billy Paul                                   | Markets             | Interest rates, unemployment, stagflation, pollution, money circulation, velocity of money                              | <a href="#">YouTube</a>            |
| 66 | Brackets                     | J. Cole                                      | Government Policies | Taxes   | <a href="#">Econ.Video</a>         |
| 67 | Here's to the Farmer         | Luke Bryan                                   | Government Policies | Taxes and subsidies, supply and demand, land prices   | <a href="#">EconGoneCountry</a>    |
| 68 | Lose Yourself++              | Eminem                                       | Government Policies | Business cycle, fiscal and monetary policy, famine, government policies   | <a href="#">YouTube</a>            |
| 69 | Money's Too Tight to Mention | Valentine Brothers                           | Government Policies | Reganomics, government's role in the economy  | <a href="#">YouTube</a>            |
| 70 | Pharaoh's Dreams Explained+  | Joseph and the Amazing Technicolor Dreamcoat | Government Policies | Opportunity cost, government policy, poverty  | <a href="#">Broadway Economics</a> |

**Table 1 continued.**

|    |                                     |                 |                      |   |                                    |
|----|-------------------------------------|-----------------|----------------------|---|------------------------------------|
| 71 | Rain on the Scarecrow**             | John Mellencamp | Government Policies  | Discouraged worker, price supports, foreclosure   | <a href="#">YouTube</a>            |
| 72 | Shock the Monkey                    | Peter Gabriel   | Government Policies  | Interest rates, inflation   | <a href="#">Business Insider</a>   |
| 73 | Shuttin' Detroit Down               | John Rich       | Government Policies  | Moral hazard, financial crisis, recessions, fiscal policy   | <a href="#">EconGoneCountry</a>    |
| 74 | Song of the South                   | Alabama         | Government Policies  | Keynesian econ, fiscal policy, spending multiplier, recessions, business cycle, cyclical unemployment, great depression | <a href="#">EconGoneCountry</a>    |
| 75 | The Taxman#                         | The Beatles     | Government Policies  | Taxes   | <a href="#">Econ.Video</a>         |
| 76 | Combination Pizza Hut And Taco Bell | Das Racist      | The Competitive Firm | Differentiation, complementary products   | <a href="#">Econ.Video</a>         |
| 77 | Hot Cheetos and Takis               | Y.N. RichKids   | The Competitive Firm | Complements, substitutes  | <a href="#">Econ.Video</a>         |
| 78 | I Like Beer*                        | Tom T Hall      | The Competitive Firm | Imperfect substitutes, imperfect competition, inelastic demand, utility   | <a href="#">YouTube</a>            |
| 79 | I Want You to Want Me               | Cheap Trick     | The Competitive Firm | Competition   | <a href="#">YouTube</a>            |
| 80 | It's Still Rock and Roll to Me      | Billy Joel      | The Competitive Firm | Innovation, preferences, competition  | <a href="#">YouTube</a>            |
| 81 | Shot Me Down                        | David Guetta    | The Competitive Firm | Competition, first mover advantage  | <a href="#">Music4Econ</a>         |
| 82 | 7 Rings                             | Ariana Grande   | Market Power         | Price taker   | <a href="#">St. Louis Fed</a>      |
| 83 | Come to the Fun Home+               | Fun Home        | Market Power         | Competition, market structure   | <a href="#">Broadway Economics</a> |

**Table 1 continued.**

|    |                              |                      |                                     |  |                                    |
|----|------------------------------|----------------------|-------------------------------------|--|------------------------------------|
| 84 | Video Killed The Radio Star  | The Buggles          | Market Power                        | Creative-destruction, preferences  | <a href="#">Critical Commons</a>   |
| 85 | American Made                | Oak Ridge Boys       | Agricultural and the Global Economy | Trade, specialization, comparative advantage   | <a href="#">EconGoneCountry</a>    |
| 86 | American Saturday Night      | Brad Paisley         | Agricultural and the Global Economy | Comparative advantage, gains from trade, international trade, consumer preferences                         | <a href="#">EconGoneCountry</a>    |
| 87 | Cost of Livin'               | Ronnie Dunn          | Agricultural and the Global Economy | Business cycle, recession, cyclical unemployment, job search, inflation, normal goods, spending multiplier | <a href="#">EconGoneCountry</a>    |
| 88 | Gaston+                      | Beauty and the Beast | Agricultural and the Global Economy | Absolute advantage, competitive advantage, trade   | <a href="#">Broadway Economics</a> |
| 89 | I'll Name the Dogs           | Blake Shelton        | Agricultural and the Global Economy | Specialization, division of labor, comparative advantage, trade  | <a href="#">EconGoneCountry</a>    |
| 90 | Made in America              | Toby Keith           | Agricultural and the Global Economy | Trade, specialization, comparative advantage, opportunity cost   | <a href="#">EconGoneCountry</a>    |
| 91 | Open Up the Border*          | Clutch               | Agricultural and the Global Economy | Barter, free trade, gains from trade, open markets, trade barriers, international trade                    | <a href="#">YouTube</a>            |
| 92 | Pretty Good at Drinkin' Beer | Billy Currington     | Agricultural and the Global Economy | Comparative advantage vs. absolute advantage   | <a href="#">EconGoneCountry</a>    |

**Table 1 continued.**

|     |                                 |                    |   |   |                                    |
|-----|---------------------------------|--------------------|---|---|------------------------------------|
| 93  | Red, White, and Pink Slip Blues | Hank Williams, Jr. | Agricultural and the Global Economy         | International trade, specialization   | <a href="#">EconGoneCountry</a>    |
| 94  | Somethin' I'm Good At           | Brett Eldredge     | Agricultural and the Global Economy         | Comparative advantage   | <a href="#">EconGoneCountry</a>    |
| 95  | We Can't Make It Here#          | James McMurty      | Agricultural and the Global Economy         | Gains from trade  | <a href="#">YouTube</a>            |
| 96  | Why We Build the Wall           | Hadestown          | Agricultural and the Global Economy         | Immigration, purchasing power   | <a href="#">Broadway Economics</a> |
| 97  | Gone Green                      | Brad Paisley       | Economics, Agriculture, and the Environment | Environment, negative externalities, market failure, technological change   | <a href="#">EconGoneCountry</a>    |
| 98  | I'd Love to Change the World*   | Ten Years After    | Economics, Agriculture, and the Environment | Externalities, market failure, pollution, population growth, redistribution | <a href="#">YouTube</a>            |
| 99  | Mercy Me                        | Marvin Gaye        | Economics, Agriculture, and the Environment | Externalities, pollution  | <a href="#">YouTube</a>            |
| 100 | No Man's Land                   | Billy Joel         | Economics, Agriculture, and the Environment | Economic growth, urban-sprawl   | <a href="#">Critical Commons</a>   |
| 101 | River Runs Red**                | Midnight Oil       | Economics, Agriculture, and the Environment | Pollution, natural resources, externalities, scarcity                       | <a href="#">YouTube</a>            |
| 102 | Santa Fe                        | The Newsies        | Economics, Agriculture, and the Environment | Public goods  | <a href="#">Broadway Economics</a> |

**Table 1 continued.**

|     |                          |                 |   |  |                                  |
|-----|--------------------------|-----------------|---|--|----------------------------------|
| 103 | Scarecrow in the Garden  | Chris Stapelton | Economics, Agriculture, and the Environment | Climate change, environment, factors of production, PPF, immigration, economic growth                | <a href="#">EconGoneCountry</a>  |
| 104 | Sunrise, Sunburn, Sunset | Luke Bryan      | Economics, Agriculture, and the Environment | Public goods   | <a href="#">EconGoneCountry</a>  |
| 105 | Closing Time             | Semisonic       | Agribusiness Management                     | Profit maximization, closing a firm, fixed and variable costs, marginal cost and revenue, management | <a href="#">YouTube</a>          |
| 106 | One Big Country Song     | LOCASH          | Agribusiness Management                     | Profit maximization, closing a firm, fixed and variable costs, marginal cost and revenue, management | <a href="#">EconGoneCountry</a>  |
| 107 | The Gambler              | Kenny Rodgers   | Agribusiness Management                     | Costs, game-theory, loss-aversion, output selection  | <a href="#">Critical Commons</a> |

### 3.1 BroadwayEconomics.com

BroadwayEconomics.com contains over 70 songs from show tunes that illustrate economic concepts (Rousu 2016). Only some of the songs that are relevant for agricultural economics are presented in this paper, as there are many others on topics like demand and supply, elasticities, and dozens of other economics topics. The songs on the site can be browsed or searched by topic, and there are sample discussion questions for educators to use posted with each song. Every song includes a description, video with call-outs, and discussion questions that could be used for in-class discussion, as homework assignments, or on quizzes or exams.

### 3.2 CriticalCommons.org

Critical Commons hosts more than just music and is a website where dozens of registered users have posted clips that can help with teaching. By using the search phrase “music for econ,” you’ll find dozens of songs on many different economic topics. Critical Commons also contains movie, TV, and news clips that cover economic topics that can be used to stimulate discussion, assigned as homework, or used on quizzes and exams.

### 3.3 DirkMateer.com

DirkMateer.com contains a plethora of econ-related teaching materials for both educators and students, including over a dozen songs, each with a description and video. There is a section for educators to share best practices and ask questions to one another, as well as a section for students to ask Dr. Mateer questions about economic topics.

### 3.4 EconGoneCountry.com

EconGoneCountry.com is designed to illustrate economic concepts in popular country music (Melichar 2018). The goal of the website is to make economics more relatable to undergraduate students by illustrating that economics is all around them. Definitions of economic concepts with links to relevant songs are contained in an index page, and there is also a search bar, which allows educators to find content that best fits their needs. As agriculture is often an important theme in country music, the website contains numerous examples for agricultural and environmental economics.

### 3.5 Econ.Video

Economics Media Library (Wooten 2018; Hobbs and Wooten 2021) hosts dozens of songs that can be used to teach economics. Like Critical Commons, this site also has clips from TV shows, movies, and more. All of the clips on the site provide a video along with a description. Some clips include discussion questions as well. These materials can be used either in class to stimulate discussions, be assigned to homework, or even be utilized as a more interactive portion of quizzes and exams.

### 3.6 Music4Econ.com

Music4Econ.com contains dozens of songs that can be used to teach economics. Each clip provides a video and description. There are also in-depth teaching guides that assist in implementing some of the songs in the classroom. The teaching guides provide questions (and answer keys) and course materials that can be implemented in class or for assignments.

## 4 Agricultural and Environmental Economics Songs

We highlight a select number of songs that can be used to teach five different topics within environmental economics: agribusiness, production and the firm, international trade, externalities, and public goods. Educators can find songs for other topics in Table 1.

### 4.1 Agribusiness

*Semisonic—“Closing Time”* (Semisonic 1998)

Semisonic sings “Closing Time,” which refers to the closing of a bar for the night. Although this bar isn’t closing permanently, there are several economic lessons that can be taken from this song. First, firms should stay open another hour (when legally allowed) when the marginal revenue exceeds the additional cost for remaining open. Presumably when a bar closes for the night, like when all firms close for the night, marginal costs exceed marginal revenue.

This song could also be used to introduce students to the idea on when a firm should shut down permanently. A firm should shut down in the short run when they cannot cover their fixed costs, and in the long run, if they cannot earn a profit. In this song, it is a short-run shut down that is considered. At closing time, the bar owner must think that the additional revenues brought in won’t cover the extra wages, materials, electricity, and so on, to keep the bar open.

Riley Green—*“I Wish Grandpas Never Died”* (Green 2019)

Riley Green’s *“I Wish Grandpas Never Died”* provides a list of wishes, one of which is: *“I wish the price of gas was low and cotton was high”* (Green 2019). This could be a good song to illustrate to students that many agricultural markets are close to perfectly competitive, with numerous producers that are price takers. Farmers, therefore, are at the whim of the market when it comes to commodity prices. Conversely, this song could also be used to discuss hedging strategies that can be taken against price fluctuations. For example, farmers are able to manage price risk through the use of futures and options contracts. Since a futures contract is an agreement to buy or sell a commodity at a predetermined price at a specific future date, farmers can hedge against price risks for a commodity by guaranteeing an established price before harvest (U.S. Department of Agriculture, 2020b). A study from 2016 found that over 47,000 U.S. farms used futures or options contracts to hedge price risk (U.S. Department of Agriculture, 2020b). Later in the song, they wish that *“farms never got sold”* (Green 2019). One of the major issues facing family farms today is competition from larger commercial operations, which take advantage of economies of scale. U.S. farms in 1945 averaged about 195 acres, whereas the average farm in 2019 was 444 acres (U.S. Department of Agriculture 1945, 2020a).<sup>3</sup>

## 4.2 Production Economics, Firm Behavior, and Profit Maximization

Luke Bryan—*“Rain Is a Good Thing”* (Bryan 2009)

*“Rain Is a Good Thing”* by Luke Bryan can be used for several purposes in teaching economics, including to discuss specialization, comparative advantage, and the difference between final goods and intermediate goods. Luke Bryan likes the rain, as it is an essential resource needed for the production of corn, which can then be used in the production of whiskey. He and his significant other both enjoy whiskey. Not only is rain good for Luke, but the farmers who he discusses at the beginning of the song also stress the importance of rain in farming.

The amount of rainfall, or lack thereof, also helps explain why different parts of the country specialize in different crops. For example, Iowa receives an average rainfall of 32 inches, while Kansas only receives 27 inches. As corn is a water-intensive crop to grow compared to wheat, it should be of no surprise that Iowa is typically one of the largest corn producing states, while Kansas is typically the top wheat producing state.

Nanci Griffith—*“Trouble in the Fields”* (Griffith 1987)

Continuing in the theme of rain as an important input in the agricultural production process is *“Trouble in the Fields”* by Nanci Griffith.<sup>4</sup> The song is set during the farm crisis of the 1980s, but a reference is made to the drought of the Dust Bowl. They sing:

*Our parents had their hard times fifty years ago  
When they stood out in these empty fields in dust as deep as snow  
...  
If this rain can fall, these wounds can heal* (Griffith 1987)

Without irrigation to supplement a decrease in the rainfall (an input), crop yield (an output) fell to zero during the Dust Bowl years of the Great Depression. The drought was so extreme that large parts of the High Plains received less than 10 inches of precipitation over several years (US Department of Commerce, N. O. A. A, 2019). However, farmers are aware that when the rain returns, agricultural production and life will return to normal. Using the production possibilities frontier (PPF), an instructor can show the decrease in rain during the Dust Bowl decreased the production possibilities of the High

<sup>3</sup> The USDA adjusted their figures for coverage after 1997.

<sup>6</sup> See Tinari & Khandke (2000) for other concepts from *“Trouble in the Fields”*

Plains, shifting the PPF inward. However, when the drought finally ended, and the rains returned, the PPF shifted back outward.

This song can be used to teach students about the three main inputs in the production process: land, labor, and capital. Water is categorized as land in the production process, but educators could also use this song to pivot and discuss other inputs. Modern agricultural production is heavily dependent on capital such as tractors, trucks, combines, and so on. During tough times, such as the 1980s farm crisis, farmers may have had to sell equipment to keep their farms, reducing their productivity. The song alludes to this when Griffith sings:

*But if we sell that new John Deere  
 Then we'll work these crops with sweat and tears.  
 You'll be the mule, I'll be the plow.  
 Come harvest time we'll work it out* (Griffith 1987)

This example can also be used to discuss productivity and the capital-to-labor ratio, which is falling as farm equipment is sold off.

“Trouble in the Fields” can also be used to teach about technological change and its impact on production. Prior to steam-powered or internal combustion engines, agricultural production depended quite literally on horsepower and physical, manual labor. These technological advancements expanded our ability to produce a final product, as seen through the PPF.

### 4.3 International Trade and Demand

*Beauty and the Beast*—“Gaston” (Disney 1991)

No one does anything like Gaston from the movie (and musical) *Beauty and the Beast*. He’s the best! (Just ask him.) In “Gaston,” we learn about how he is better than anybody else at just about any task. The people praising Gaston sing:

*No one hits like Gaston  
 Matches wits like Gaston  
 In a spitting match nobody spits like Gaston  
 ...  
 Who has brains like Gaston?  
 Entertains like Gaston?  
 Who can make up these endless refrains like Gaston?* (Disney 1991)

It is clear Gaston has an absolute advantage in production. This is a good song to use when teaching about trade because while Gaston has an absolute advantage, this does not mean that he cannot benefit from trade. This, of course, is because trading occurs based on comparative advantages. So just because no one “*hits like Gaston*” does not mean that Gaston cannot enjoy the benefits of trading with others (Disney 1991).

*Toby Keith*—“*Made in America*” (Keith 2011)

One of the main reasons economists support free trade is that it leads to specialization and greater efficiency. These lower production costs can then be passed along to consumers in the form of lower prices. As a result, purchasing products made in the United States often comes with a higher price tag. In “*Made in America*” by Toby Keith, an elderly farmer is willing to “*spend a little more in the store for a tag in the back that says U.S.A.*” (Keith 2011). Interestingly, this song can also be used to discuss determinants of demand, specifically tastes and preferences. It is often said that consumers “*vote with their wallets,*” and paying more for American-made products is a great example of this (Keith 2011).

Although the song may make it seem that international trade is detrimental and we should only purchase domestic goods and services, it is important to remember that economies have limited resources and must deal with opportunity cost. In “Made in America,” *“it breaks his heart seein’ foreign cars, filled with fuel that isn’t ours, and wearin’ cotton we didn’t grow,”* but what is the opportunity cost of increasing U.S. cotton production (Keith 2011)? There is only so much arable land, and much of it may be better suited for producing other crops such as corn, soybeans, and wheat. The United States may have a comparative advantage in corn and would be better off focusing resources on that commodity, as there may be a high opportunity cost of producing more domestic cotton. This song is great for illustrating the advantages of specialization and free trade, which can result in more goods and services at a lower price, benefiting domestic consumers.

#### 4.4 Externalities

*Ten Years After—“I’d Love to Change the World”* (Ten Years After 1972)

In the song “I’d Love to Change the World,” Ten Years After discusses environmental economics issues. The song starts by discussing population growth. A higher population creates a higher demand for food, having a negative impact on the environment. This idea has caused many to think overpopulation would lead to disastrous consequences from Thomas Malthus (1798) in the 1700s and others more recently (Sabin 2013), but doomsday predictions have turned out to be incorrect based on tremendous productivity growth in agriculture.<sup>5</sup>

*Uncle Lucius—“Keep the Wolves Away”* (Lucius 2012)

The negative effects of pollution on society’s standard of living can also be viewed through “Keep the Wolves Away” by Uncle Lucius. In the song, there are multiple references to market failures and negative externalities. The song tells the story of a young boy growing up in a lower middle-class family south of Houston, TX. The skyline where he grew up is *“colored by chemical plants,”* and in the music video, a drawing shows his house overshadowed by smokestacks and pollution (Lucius 2012). As a teenager, an oil tanker spills *“poison”* into Galveston Bay in the Gulf of Mexico, creating large external costs. Living in polluted areas decreases standards of living and can lead to negative health outcomes, so the family moves away *“where the sky isn’t heavy with refinery clouds”* (Lucius 2012).

Externalities that are uncorrected by proper taxation will mean there is too much pollution, relative to the optimal amount, given that firms are not internalizing the pollution costs. This song gives a good opportunity to introduce externalities and also discuss policies (e.g., taxes or cap-and-trade) that can bring pollution down to an economically optimal level.

#### 4.5 Public Goods

*Newsies—“Santa Fe”* (Menken 1992)

The other most common market failure discussed in applied economics courses are that of public goods. There are songs that can be used to teach about public goods as well. In both the prologue and the reprise of “Santa Fe,” from the musical *Newsies*, Jack sings about the clean air in Santa Fe, New Mexico. Clean air is a public good as its value does not diminish when an additional person consumes it, and it is difficult to exclude people from consuming it, even if the person is unwilling to pay. “Santa Fe” is a great song to play for students to set up a discussion about public goods.

*Luke Bryan—“Sunrise Sunburn Sunset”* (Bryan 2017)

Another example of public goods can be heard in “Sunrise Sunburn Sunset” by Luke Bryan. One of life’s great pleasures is watching a beautiful sunrise or sunset. What makes this experience even better is that any one individual’s consumption of a sunrise doesn’t make it any less beautiful or stunning for others.

<sup>5</sup> Some still make similar claims today (e.g., Prasad 2013; Hincks 2018).

The song also describes a full moon and a night sky lit up with stars, which a group of friends are all able to enjoy without decreased utility for any one individual.

## 5 Conclusion

Using music can help engage students. Given many songs have economic themes, some economists have created lists of songs educators can use to parlay the love of music into improved learning. But to this point there hasn't been a focus on songs that specifically work for agricultural, environmental, and applied economics.

In this paper, we highlight songs that can be used when teaching these topics. We've provided details on ten songs that cover topics on agribusiness, production and the firm, international trade, externalities, and public goods, providing a table that contains these songs plus an additional ninety-seven songs that can be used for teaching economic topics. All songs can be accessed for free.

We also include four lesson plans that educators can use to integrate songs and other activities to make their teaching more impactful in the attached appendices. Integrating the use of some of these songs into teaching is a low-cost way to become a better educator, provide lessons that reach more students, and help foster a love of economics among students.

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## Appendix 1: Lesson Plan on Agribusiness and the Shut Down Rule

### Teaching the Shut Down Rule Using Music and a Think-Pair-Share

**Goals:**

1. Students will understand a firm should shut down if  $P < AVC$  in the short run.
2. Students will understand a firm should stay open if  $P < ATC$  in the long run.

**Time Needed:**

25 minutes

**Materials Required:**

None

**Overview:**

Understanding firm decisions in the short run and long run can be a confusing concept for students. In the short run, a firm would choose to stay open if the price they are receiving for a product exceeds the average variable cost. Using a bar's closing time as an example can be ideal for this, as it should be easy for students to understand the variable costs involved in staying open another hour (bartender labor, input costs for alcohol), and the fixed costs that aren't factored (the rent for the bar).

**Plan for the Classroom:**

Note: the general concepts of average fixed costs, average variable costs, average total costs, and so on, should already have been covered prior to this lesson.

1. Have students come up with a list of all the variable and fixed costs of running a bar. Three key costs that should eventually get listed are hourly wages for bartenders (variable), input costs for drinks (variable), and the rent for the bar (fixed).
2. Play "Closing Time" by Semisonic.
3. Have students do a think-pair-share, and ask the following question. "Thinking about profits/losses, if a bar has total control over when they choose to close for the night, why would a bar choose to close down at 2:00 A.M. instead of 3:00 A.M.?"

**Discussion:**

Discuss that for a bar to stay open, the money the bar is bringing in during that last hour should exceed the variable costs.

- a. The money customers spend should exceed the hourly wage for the bartender and the costs for the drinks.
- b. Could discuss that it isn't the most profitable hour—and if every hour was like that, the bar wouldn't make a profit because they couldn't pay the rent. But staying open in the short run isn't about prices being more than *average total cost*, it is about prices being more than *average fixed cost*.

## Appendix 2: Lesson Plan on International Trade

### Teaching International Trade Using a Trading Game

**Goals:**

1. Teach students about agricultural international trade using music.
2. Allow students to experience trade and gains from trade in a simulation using candy.

**Time Needed:**

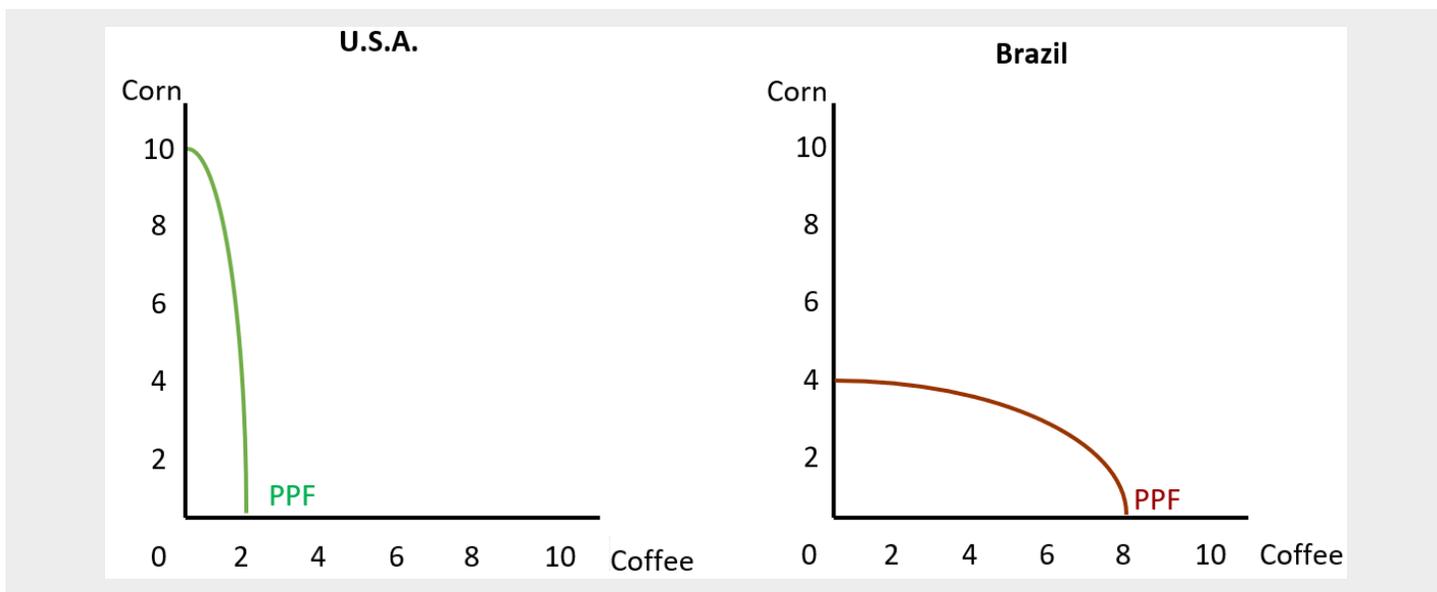
30 minutes

**Materials Required:**

Assorted candy (like the kind commonly sold around Halloween)

**Overview:**

International trade is the exchanging of capital, goods, and services, and in this case agricultural products across the borders from one country to another. The amount of production a country is able to produce is shown by the production possibilities frontier (PPF). The goal of international trade is for one country to acquire these goods/services that either cannot be produced domestically, or domestic production is not able to meet the demand (i.e., the quantity is outside of the PPF). This is especially important in agricultural economics, as not every country has the capabilities to produce all of the goods (e.g., the U.S. is very good at producing the crops of corn, cotton, soybeans, and wheat; however, we cannot produce enough coffee or cocoa to satisfy the demand of the entire country). Being the leading producer of a certain good is a lot like Gaston in the *Beauty and the Beast*, as Gaston is the best, having an absolute advantage. Having an absolute advantage does not mean that a country is not able to benefit from trade. A country can also have a comparative advantage, which is the production of a certain good at a lower opportunity cost. Let's look at an example of this using the hypothetical production of corn and coffee between the U.S. and Brazil:



We can see that the U.S. has an absolute advantage in corn ( $10 > 4$ ) while Brazil has an absolute advantage in producing coffee ( $8 > 2$ ). We can calculate the comparative advantage of each country by calculating the opportunity cost for each country to produce either good:

**U.S.:**

Cost of producing corn:  $10 \text{ corn} = 2 \text{ coffee}$  or  $1 \text{ corn} = \frac{1}{5} \text{ coffee}$

Cost of producing coffee:  $2 \text{ coffee} = 10 \text{ corn}$  or  $1 \text{ coffee} = 5 \text{ corn}$

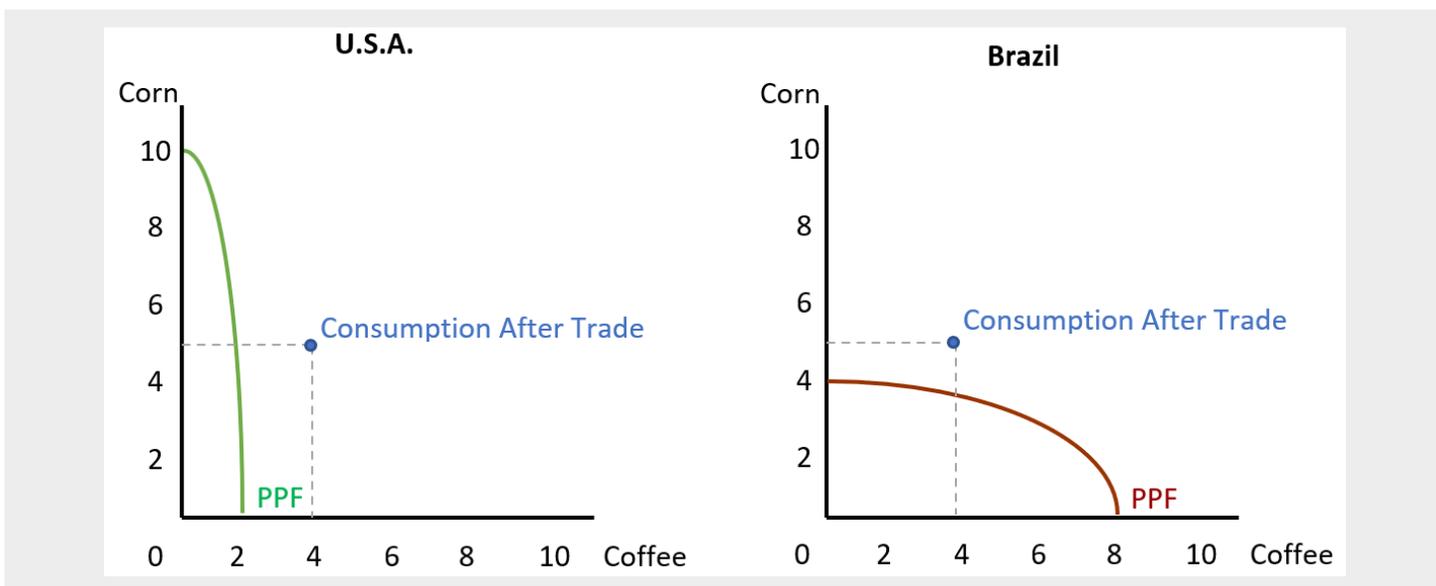
**Brazil:**

Cost of producing corn:  $4 \text{ corn} = 8 \text{ coffee}$  or  $1 \text{ corn} = 2 \text{ coffee}$

Cost of producing coffee:  $8 \text{ coffee} = 4 \text{ corn}$  or  $1 \text{ coffee} = \frac{1}{2} \text{ corn}$

*This U.S. has a competitive advantage in producing corn (since  $\frac{1}{5} < 2$ ), and Brazil has a competitive advantage in producing coffee (since  $2 < 5$ ).*

It makes a lot of sense for the U.S. to specialize in crops that we are good at producing efficiently and at a relatively low cost (such as corn, cotton, soybeans, and wheat) and export the surplus of these products to other countries. Similarly, we will import crops (such as coffee or cocoa) that we are not able to produce as efficiently. This is known as specialization and trade. The song “Made in America” discusses the importance of domestic production, especially when the product is something that the country specializes in, such as cotton. With specialization and trade, countries specialize in producing one good and trade it to another country; this allows both countries to consume outside of their PPF. For example, if the U.S. produces 10 corn, trading half to Brazil, and Brazil produces 8 coffee, trading half to the U.S., the production will look like this:



Since countries can consume outside of what they can domestically produce, they have received gains from trade.

**Demonstration/Activity:**

After defining and ensuring the students have an understanding of the terms above, tell each student they will now represent a country and will trade with other countries. Provide each student with a bag of 3–4 pieces of candy (be sure to get a wide variety of candy to ensure that everyone’s preferences can be met to a certain extent with trade), a slip of paper with the below table, and explain to them that these are the agricultural goods that they are able to produce given their country’s resources. Explain that this candy is theirs to keep or trade.

| Name:                   | Round 1  | Round 2        | Round 3             |
|-------------------------|----------|----------------|---------------------|
|                         | No Trade | Regional Trade | International Trade |
| Did you trade? (yes/no) | no       |                |                     |
| Utility (1–10)          |          |                |                     |

Tell the students of all the different types of candy that are available in the room (they may not know what others have since they only have 3 pieces). After students are aware of the candy available, ask them to rank their utility from 1 to 10 with their items relative to everything that is available in the Round 1 column on their table.

After students have all rated their utility of what their country is able to produce without trade, allow them to trade with 1 other student only that is sitting next to them if they wish. After students have experienced regional trade, ask for a show of hands to see who traded and have the students record their results in the Round 2 column.

Now, allow them to trade internationally—with anyone in the class—if they wish. After students have experienced international, ask for a show of hands to see who traded and have the students record their results in the Round 3 column.

Collect the sheets of paper to enter the utility into excel and produce a graph of class total utility after each round to show how the utility increases with each round as trade becomes freer.

**Discussion:**

After the activity, ask for a show of hands to see if anyone did not trade at all? Ask what these individuals did not trade (perhaps nobody wanted to trade with them, or they did not wish to trade anything away). Next, ask for a show of hands to see if student’s individual utility increase? Make it a point to acknowledge how most individuals’ utility increased after trading with others. Next, ask students what their goal of trading was (perhaps they were more focused on obtaining their favorite type of candy, or some may have been focused on getting rid of something they particularly do not enjoy). Ask the students how this activity of trade within the classroom may apply to countries who wish to participate in international trade (and what would it be like if a country could only consume goods/services that they can produce)? End the discussion by asking for a show of hands of who thinks trade and free/open markets are good and who benefits?

## Appendix 3: Lesson Plan on Production

### Teaching the PPF Using Luke Bryan’s “Rain Is a Good Thing”

#### Goals:

1. Students will understand the purpose of the production possibilities frontier (PPF).
2. Students will learn that an increase in inputs/resources expands the set of production possibilities.

#### Overview:

Individuals and society must decide how to efficiently allocate scarce resources. The production possibilities frontier (PPF) model illustrates the combinations of two goods or services that an individual or society can produce if all resources are being used efficiently. The inputs, or resources, used in the production process include land, labor, and capital. Land is the geographic location used in production, labor is the physical and mental talents of workers, and capital is manufactured goods used to produce other final goods and services. In the PPF model, it is assumed that both the resources and technology used in the production process are constant or fixed. As a result, production is limited by the available resources and current level of technology.

But if inputs change, the PPF can change. Luke Bryan’s “Rain Is a Good Thing” can be used to help illustrate this.

#### Plan for the Classroom:

1. Do a think-pair-share where students graph a PPF for corn and soybeans.
  - a. Students create a PPF on their own.
  - b. Then compare with students next to them.
    - i. May wish to reassure students that each graph will likely be a bit different.
2. Have one student come up to the board and graph their PPF for the classroom.
3. Play “Rain Is a Good Thing” by Luke Bryan.
4. Tell students to assume that their first graph was with suboptimal rain conditions, but that an optimal amount of rain is now falling. Have students graph a new PPF for corn and soybeans.
5. Second graph should be further out than the first graph, noting increased efficiency.
  - a. With optimal rain levels, more corn, soybeans, or both corn and soybeans can be produced.

## Appendix 4: Lesson Plan on Public Goods

### Teaching Public Goods with Music and Games

#### Goals:

1. Students will be able to define a public good.
2. Students will understand the free-rider effect.
3. Students will understand that public goods tend to be underprovided in market environments.

#### Time Needed:

25 minutes

#### Materials Required:

Incentives, which could be money, candy, extra credit points, or something else.

#### Overview:

A public good is a product with two features:

- The quality does not diminish when an additional user consumes the product.
- It is difficult/impossible to exclude people from consuming the product.

Public goods will be underprovided in a pure market economy as individuals have an incentive to free-ride—i.e., consume what others purchase. Using both a simple game and the song “Santa Fe” from Newsies, this is a fun lesson for students to learn about public goods.

#### Plan for the Classroom:

1. Play the contributions game. If you have students contribute money, it is easy to do for money. Otherwise, you may need to find some other mechanism—like extra credit points. Two options are provided at the end of this lesson, feel free to edit to your taste.
2. Discuss public goods and their features. Key things to address:
  - a. Quality doesn’t drop with additional users.
  - b. Cannot exclude people, even if they don’t pay.
  - c. This leads to an incentive for individuals to free ride.
    - i. Can look at the game—all would be better if they contributed. But each individual had an incentive not to.
3. Play the song “Sante Fe” from Newsies. Before playing, ask the students to determine what public good is referenced.
  - a. Link here: <http://broadwayeconomics.com/santa-fe-newsies/>
4. Have the students get into small groups to determine:
  - a. What public good is referenced, and
  - b. Why it satisfies the features of a public good.
5. Discuss that because of the free-rider effect, too few public goods will be provided without intervention.

#### Discussion:

A public good has two key features, nonexcludable and nonrival. That is, the public cannot easily exclude somebody from consuming it, and the quality of the good does not diminish if additional users consume it. Because of these features, individuals have an incentive to free ride, or not pay for public goods themselves but enjoy what others provide.

This is considered a market failure because, unlike for most products, markets won't lead to the optimal quantity being produced. With public goods, too few will be produced without intervention. Usually, this intervention comes in the form of governments collecting taxes and then providing the good.

There are alternatives to government intervention, however. Elinor Ostrom won the 2009 Nobel Prize in economics (the first woman to win the prize) by showing that individuals can often create their own rules to combat market failures without the government intervening.

**Contributions Experiments (Option for Money)**

Name # \_\_\_\_\_

You have the choice to donate \$2 to the group from your personal account. If you do, everyone in class today (including yourself) will have \$0.35 contributed to their account.

For every person in the class who contributes, \$0.35 will be contributed to your account. (This is regardless of whether you contribute or do not contribute.)

Your choice (circle one)    **CONTRIBUTE / DO NOT CONTRIBUTE**

**Contributions Experiments (Option for points)**

Name # \_\_\_\_\_

You have the choice to donate 5 points from your grade. If you do, everyone in class today (including yourself) will have 1 point added to their grade.

For every person in the class who contributes, 1 point will be contributed to your account. (This is regardless of whether you contribute or do not contribute.)

Your choice (circle one)    **CONTRIBUTE / DO NOT CONTRIBUTE**