Candyland Economics: Finding the Sweet Spot to Better Teach the Economics of International Trade Through an Interactive, Fun, and Delicious Game

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Abstract

International trade has been a central focus of economics since the inception of the discipline. Despite everything we have learned about the benefits of free trade, the topic remains one of the most difficult for students to comprehend, especially in today's climate, where trade policy has become so polarizing. This paper describes a simple, easy-to-understand, student-involved, and dynamic trading game that is designed to cut through all the noise and controversy surrounding trade policy to convey essential insights about trade. It also describes how trading games like this one can serve as a jumping-off point for more in-depth discussions of a wide variety of economic topics related to the subjective theory of value and monetary economics.

Keywords: Economics, educational games, gains from trade, international trade.

1. Introduction

Since the inception of economics as a discipline, international trade has remained one of its most well-developed subfields. In the Wealth of Nations, Smith (1776) seminally explained how specialization and the division of labor work to dramatically increase labor productivity. Building on Smith's work, Ricardo (1817) developed the theory of comparative advantage to explain who should specialize in producing a good (namely, the person or nation who could produce it at the lowest opportunity cost).

Economists notoriously disagree on a wide range of policy debates. However, arguably, no issue has united economists more than their belief in these principles and their almost universal support for free and open trade between nations (Alston et al., 1992; Krugman, 1987; Whaples, 2009).

Despite this virtual consensus amongst economists in its favor, international trade has become an increasingly controversial topic amongst the general public. In point of fact, non-economists are far more likely to view trade as detrimental to domestic jobs and economic growth (Caplan, 2007). Anti-trade sentiment has only grown in recent years following the rise of a variety of new challenges and policy considerations. These challenges include, but are by no means limited to:

1. The rise of globalization after the collapse of the Soviet Union,
2. The “China shock” that resulted from the opening of trade with China,

Skepticism towards trade has today become a bipartisan concern. In the United States, both the Trump and Biden administrations have imposed trade restrictions on a wide variety of imports into the US in response to this political backlash (Anderson, 2022; Khalid, 2021; York, 2022).

With all the controversy and confusion surrounding trade, those engaged in teaching economics are in greater need than ever for innovative ways to communicate the gains that are derived from international trade to their students. In the recent past, many economic educators have made use of games and classroom experiments in order to better explain and illustrate basic economic concepts and ideas (Becker & Watts, 1995; Dickie, 2006; Holt, 1999). This article describes a simple, easy-to-understand trading game that is designed to cut through all the noise and controversy surrounding trade policy to convey essential insights about gains from trade, based on the childhood
game “Candyland.” In this article, the authors demonstrate the basic mechanics of the game and how a typical game of “Candyland Economics” would progress in the classroom. The authors then go on to discuss how this involving, fun (and yes, delicious!) game can serve as a jumping-off point for the discussion of a wide range of economic topics related to the subjective theory of value and monetary economics.

2. The Game of “Candyland Economics”

2.1. Stage 0: Setting the Stage for the Game

At the start of the class, students are told that rather than a lecture, they would get to play a game in class! Then, the instructor provides them with a simple set of instructions to get them ready to play the game. Students are told to do three things:

1. Clear off your desk (yes, including your phone and other electronics!),
2. Take out a pen (or pencil) and a loose-leaf sheet of paper,
3. Write your name in the top-left corner and prepare a blank number list from 1 to 5.

Admittedly, the vague (perhaps even portentous) nature of these instructions is designed to make students think that they are about to be subjected to a pop quiz! After giving the students sufficient time to follow the instructions outlined above, the instructor relieves the tension in the classroom by revealing a giant bag of candy! Instantly, students should- and do-quickly realize that this is not some ominous pop quiz, but rather, an in-class experiment that portends fun, candy, and maybe a little learning, too, for them! The instructor then tells the students that they will be playing a game called “Candyland Economics,” and he/she can then proceed to lay out the rules of the game in a much more relaxed classroom than what it was 30 seconds prior to him/her bringing out the candy!

2.2. Stage 1: Rank and Assign “Utility Points” to Each of the Five Candies

In the first stage of the game, students are instructed to rank the five candies that are used in this game from favorite to least favorite next to the numbers 1–5 outlined on their loose-leaf sheet of paper. For the sake of this article, we will assume that the five candies used in the game are:

1. Blow Pops,
2. Starbursts,
3. Hershey’s Kisses, 
4. Peppermints, and
5. Tootsie Rolls.

When you submit your final version, after your paper has been accepted, prepare it in a two-column format, including figures and tables.

Do note that this is just a sample list of five candy types to include in the exercise. Instructors have complete leeway to choose whatever candies they might prefer—based on factors including their local culture, tastes, and, yes, the price to be paid for the amount of candy to make “Candyland Economics” work with especially large classes! However, instructors should try and make an assortment of five candies that are rather uniform in size (i.e., not one candy of a small, “fun” size and another in a giant size!), flavor and local taste preferences, and yes, price (i.e., not mixing one candy type that is low in price vis-à-vis another that might be quite expensive in its retail cost).

After ranking the five types of candies included in the exercise, students are instructed to assign “utility” points to each candy that corresponds to their level of happiness (or “satisfaction”) with each type of candy—five points for their favorite, four points for their second favorite, three for their third favorite, two for their fourth favorite, and only one point for their least favorite. Importantly, each piece of a particular type of candy must receive the same utility points for reasons that will become apparent in the later stages of the game. For example, a student who receives three Hershey’s Kisses must assign each one the same number of points. If Hershey’s Kisses are their third favorite candy, for instance, each of the three pieces would be worth three points (9 points in total).

2.3. Stage 2: Calculate the Total Utility Points from Your Initial Endowment of Candy

Once students have assigned utility points to each type of candy and written their answer in permanent ink, the instructor can proceed to stage 2 of the game: Passing out each student’s initial “endowment” of candy. In this stage, the instructor passes out bags that contain five total pieces of candy (i.e., the student’s initial candy “endowment”). Students are then asked to calculate their initial point total based on the rankings and utility points that they assigned to each candy in stage 1 of the game. It is again worth noting that it is imperative that students rank the five candies before stage 2 begins. This is critical so that they cannot alter their rankings later in the game to exaggerate how much their score improved over the course of the game. Once they have calculated their initial point total, students are then instructed to write and circle this number on their sheet.

Take a hypothetical student, Charlie, as an example. Suppose that Charlie assigns the following rank order preferences (as shown in Table I) to the five candies included in the selection mix for this particular use of the “Candyland Economics” game/exercise.

Now suppose that, after Charlie has written down his candy rankings, the instructor gives Charlie a bag that contains the following five candies: One Starburst, one
Hershey’s Kiss, and three Tootsie Rolls. In this case, Charlie’s point total from his initial endowment would be 10 points (four points for the single Starburst, three points for the lone Hershey’s Kiss and one point each for the three Tootsie Rolls). Charlie would then circle this point total of “10” and write “initial endowment” next to it.

Instructors have significant leeway to determine just how they go about distributing the five pieces of candy that are in each bag. The best practice, however, is to make the initial endowment of candy in each bag contain as random and wide a variety of candies as possible rather than giving students a bag (intentionally or unintentionally) that contains five pieces of one type of candy. As will become clear in stage 3 of the game, for example, a student who ranks Blow Pops as their favorite candy (having 5 points assigned to it as their personal favorite) would have no incentive to play the game if they received an endowment bag that had five Blow Pops in it (as they would have already achieved the maximum 25 points of utility at the outset!). Instructors are therefore advised to try and make sure that there is at least some diversity of candies in each endowment bag, for instance. Thus, a typical “starting” endowment bag for a random student might contain, for instance, Two Hershey’s Kisses, two Blow Pops, and one Tootsie Roll; or Three Tootsie Rolls, one Blow Pop, and one Starburst; etc. Any combination should suffice so long as there are exactly five pieces in each bag. Instructors are advised against simply putting one type of candy in each bag. The greater the variety of initial endowments in the classroom, the better the “Candyland Economics” game will work as a good and interesting learning experience—for them and for you!

2.4. Stage 3: Trade with Your Classmates to Maximize Your Point Total (and Your Utility)

Once the students have tallied and recorded their initial point total from their endowment bag (in stage 1), based on their rank order preferences of each of the five candies (in stage 1), the instructor can proceed to the main part of the game: Stage 3. In stage 3, students are instructed to trade with their classmates. Their sole objective in order to “win” the game and to earn full credit on the assignment is to raise their point total as much as possible by trading with their classmates. Since the maximum possible number of points is 25, instructors are encouraged to tell students to try to get as close to 25 utility points as possible in order to “win” the game (and as a byproduct, of course, to earn a good grade and to end-up with a selection of candies that most suit their personal preferences).

At the outset of stage 3, there are two restrictions placed on students. First, students are not allowed to consume any candy until after the game is over! The instructor should note that if they did choose to eat even a single piece of the endowment of 5 candies, they could potentially greatly reduce their point totals between various rounds of the trading game and, ultimately, their grade on the trading exercise. Second, students must only conduct “one-for-one” exchanges. For instance, a student like Charlie, who ranks Tootsie Rolls as his least favorite candy, might be tempted to trade away all three of his initial Tootsie Rolls for, say, one Peppermint that he truly prizes. However, students should be advised against making any such uneven trades. The reason becomes obvious when you consider the way the points system works: If Charlie were to make this hypothetical trade of three Tootsie Rolls for one Peppermint, he would then likely see his utility decrease from voluntary trade. Another way to frame this rule would be to say that at any time during the game, students must always possess a total of five pieces of candy. Students must, therefore, start and finish the game with exactly five pieces of candy in their possession. Their objective is to maximize their point total with the five pieces, which they will ultimately finish the game within their possession after all trading has concluded.

Stage 3 is typically divided into three rounds. In the first round, students are restricted to only trade with one person sitting immediately next to them. In the second round, these restrictions on trade are loosened, as the instructor then allows students to make trades with any student in their immediate vicinity (their row, aisle, and so on). In a normal classroom setting, a good “rule of thumb” is for the students not to get up from their desks in order to make trades. In the third and final round of the game, however, all trade barriers are removed. Students are encouraged to walk around the classroom and complete any (and all) trades that might raise their point total. At the end of each of these three rounds of the trading game, students are instructed to recalculate and tally their point totals on their score sheets.

Take an example from our hypothetical student, Charlie. Suppose that during the first round of trades, Charlie was able to trade away one Starburst for one Blow Pop. By doing so, he would have raised his utility from 10 points to 11 points (as at the end of round one, based on his ranked candy preferences, Charlie now has one Blow Pop worth five points, one Hershey’s Kiss worth three points, and three Tootsie Rolls, worth one point each). If, in the second round of trades, Charlie was able to trade away one Hershey’s Kiss for one Starburst and one Tootsie Roll for one Hershey’s Kiss, he would have raised his utility from 11 points to 14 points (as at the end of round two Charlie now has one Blow Pop worth five points, one Starburst worth four points, one Hershey’s Kiss worth three points and two Tootsie Rolls worth one point each). If, in the third round of trades, Charlie was able to trade each of his Tootsie Rolls for one Starburst and one Peppermint, respectively, and then trade away the Peppermint he received for a Blow Pop, he would have raised his utility from 14 points after the second round of trades to 21 points (as at the end of the third and final round of trades, Charlie would then possess: Two Blow Pops, two Starbursts, and one Hershey’s Kiss). Over the course of the trading game, therefore, Charlie more than doubled his utility from 10 points to 21 points!

The only requirement typically for students to receive full credit on their game performance is that they must show that they were able to increase their initial utility through trade. To incentivize students to engage in as many trades as possible, additional bonus points—or even candies—can be offered for the students who were able to: (A) increase their point total the most (very often, there will be examples of students who raise their initial point
total from, say, seven or eight points all the way to 20 or more points!); and/or (B) engage in the highest number of trades. Remember that at the outset of stage 3, instructors are advised to remind students that their objective is to achieve the highest possible point total—that being 25 points! Although few students in actuality will ever reach a “perfect score” of 25 points, this maximum possible point total gives them a concrete numerical target to shoot for in playing the game and making their trades to heighten their score (i.e., their utility). It also discourages students from deviating from the rules of the game to achieve some ulterior motive, like finishing with a diversity of candies rather than just their favorite(s). For this reason, some instructors may choose to offer additional bonus points (or more candy) to any student(s) who might indeed reach a “perfect” 25 points!

3. Findings

Table II indicates the change in utility over the course of this trading game achieved over the past two years and across 12 sections of a university’s principles of macroeconomics class. These numbers represent combined totals across three sections of this class in each semester. Each of these three sections contained somewhere between 38 and 44 students (roughly 40 on average).

As Table II illustrates (and as economic theory would suggest), the classes in the aggregate experienced an increase in the point total in each round of the trading game. By the end of the game, the classes saw their utility points nearly double, even though, as you will recall, the total pieces of candy in the classroom from the start of the game and to its end remained unchanged.

4. Takeaway

These results show that the “Candyland Economics” game can be used as an interesting, fun, and effective launching pad to teach students a variety of economic lessons that apply across a variety of fields (microeconomics, macroeconomics, international trade, and so on). These lessons, all important economic insights and principles, include:

- Gains from trade;
- The fundamental theorem of exchange;
- Economic value is subjective;
- The allocative efficiency of the market;
- The macro-level benefits of international trade;
- International trade policy; and
- The role of money in trade.

4.1. Gains from Trade

The first (and perhaps most obvious) lesson that the game conveys is what economists call “gains from trade.” A common fallacy that students often believe when they first enter a class on principles of economics is that all economic transactions are “zero-sum.” In many of the sports and games that students likely grew up playing, there is typically a “winner” and a “loser.” The winner’s victory thus has to come at the loser’s expense. As such, the flipside of the “thrill of victory” is the “agony of defeat.” Thus, it is tempting for students to extrapolate this “zero-sum” game-based mentality to the realm of our economic interactions. This is especially prevalent today when American students hear politicians, often on a bipartisan basis, call for trade wars and protectionist policies, including tariffs and quotas, in order for “our” country to avoid getting “beaten” or “taken advantage of” by our international trading partners (Franck, 2018).

4.2. The Fundamental Theorem of Exchange

One lesson this game makes clear, however, is that trade is not a zero-sum game. “Candyland Economics” demonstrably teaches that voluntary exchange is mutually beneficial, as it makes both sides better off. Both parties to a trade are able to increase their “utility” (their overall level of satisfaction). If either party’s utility would decrease from a proposed exchange, they simply would not engage in the trade. By definition, then, both parties to an exchange are made better off. Whenever our hypothetical student Charlie engages in a trade with a classmate (let’s call this classmate Willy), for instance, he trades away something he values less (say, a Tootsie Roll) in exchange for something that he values more (say, a Blow Pop). The same is true for Willy, the student on the other side of the exchange. Willy is trading away a candy that he values less (a Blow Pop) for something that he values more (a Tootsie Roll). Both Charlie and Willy are thus made better off through their trade activity. Economists refer to this insight that trade is mutually beneficial as the “fundamental theorem of exchange,” and it is one of the most bedrock principles in all of economics. The Candyland Economics game affords students the opportunity to experience this in action for themselves in the classroom simply by engaging in trades with their classmates for the candies that they personally prefer over others.

4.3. Economic Value is Subjective

The game also allows instructors to emphasize another important microeconomic lesson: This is the idea that economic value is subjective. The reason why Charlie and Willie were able to engage in trade precisely was because they each placed different valuations on the candies based on their personal taste and preferences. If Willy had the exact same rank order preferences for each of the candies as Charlie had, then they would not have engaged in the trade in the first place. All economic value, then, is subjectively determined by individuals—with beauty being in the eye of the beholder, so to speak.

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<th>TABLE II: TRADING GAME POINT TOTALS ACHIEVED BY STUDENTS OVER FOUR SEMESTERS, 2021-Spring 2023</th>
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This fact that trade is mutually beneficial and all economic value is subjective allows instructors to highlight yet another fascinating insight about trade: It is our differences that make trade possible in the first place! If everyone in the classroom had the same rank order candy preferences, there’d be no incentive to trade or gains from trade to be captured. A similar observation can be made about each student’s initial endowment of candy. If every student had been given the same exact initial endowment of candy, the scope for mutually beneficial trades would’ve been significantly limited. It was precisely because students had different (subjective) tastes and preferences, as well as significantly different initial endowments, that the utility of the entire classroom and each student therein was able to increase through trade.

All too often, students are inclined to think of our differences as being a bad thing, something that imposes an added obstacle or burden. Trade, however, allows us to capitalize off our differences in a way that creates wealth and prosperity for all!

Finally, it is worth noting here that the increase in prosperity that the entire class experienced didn’t come about because more candy was created or added over the course of the game. In a classroom with 40 students, the game started and ended with exactly 200 pieces of candy. Our prosperity increased from trade alone—merely from exchanging fixed quantities of goods with no new production taking place (i.e., no new candy being introduced into the classroom).

4.4. The Allocative Efficiency of the Market

Another lesson worth noting is that simple exchange does not only increase the utility of the two (or more) parties to an exchange. Rather, trade also serves to improve the allocative efficiency of the entire economy, meaning that goods are more optimally allocated to the people who place the highest value on them. It does so by moving goods out of the hands of people who value them less and into the hands of people who value them more. The benefits of trade, therefore, are not limited to the micro-level interaction between two individuals. They extend to the macro level as well.

Over the course of the game, candy is constantly moving out of the hands of people who value it less and into the hands of people who place the highest value on it. The allocation of goods across the entire economy is thus made more efficient thanks to voluntary trade. It is worth noting that this desirable outcome arises not as a result of any sort of top-down orders or commands that are given by some omniscient central planner. It instead arises as an unintended byproduct of dozens of voluntary trades.

The Candyland Economics game thus serves as a powerful illustration of Smith’s (1776) famous metaphor of the “invisible hand.” As Smith noted, economic efficiency emerges not through top-down planning but through the bottom-up interaction of individuals throughout the economy pursuing their personal interests. In fact, if you were an alien observing the world from outer space, this efficient, orderly outcome might appear as if it were the result of a coordinated, top-down design. In fact, it is the result of the “spontaneous order” of the market (Ferguson, 1996; Menger, 1871).

4.5. The Macro-Level Benefits of International Trade

These lessons about gains from trade do not only apply to our micro-level exchanges. Indeed, they can also be used to illustrate the macro-level benefits of international trade, which is why this game is applicable not only in microeconomics courses but also in courses on macroeconomics and international economics. The reason the game is divided into three rounds is to illustrate how restrictions on trade make individuals and the economy as a whole worse off. The fewer trading partners students can access, the fewer mutually beneficial trades they will be able to engage in, and thus, the lower the ceiling on how much they will be able to increase their utility through trade.

In the parlance of international trade, students begin the game from a situation of “autarky.” At that point, no trades have taken place. In the absence of trade, students would be restricted to consuming just their initially allocated endowment. The first round of the game (where students are restricted to only trading with one student right next to them) represents a shift from autarky to a limited degree of exchange, much like a small village or nation experiences when it opens trade with a neighboring village or nation. The second round (where students are allowed to trade with anyone in their area of the classroom) represents an expansion of trading networks, analogous to a situation like the North American Free Trade Agreement (NAFTA) or the European Union (EU), where an individual nation enters into a multilateral trade deal with its neighbors. The third and final round represents what economists might consider global “free trade.” Students are able to trade with any student in the classroom, similar to a free trade agreement that allows individuals to trade freely with citizens of any other nation.

4.6. International Trade Policy

After the game has concluded, the instructor should then ask students a simple question: “Which round of the game enabled you to truly maximize your utility/gains from trade?” The answer is obvious: Round three—simply because it gives students access to most potential trade partners, thereby increasing their chances of maximizing their gains from trade. This allows the instructor to use the game as a launching point for a variety of policy debates related to international trade by asking a series of questions to the participating students. These include, but are not limited to:

- Which round(s) of the game best approximates a situation of “protectionism”? (Answer: Rounds one and two, for the reasons outlined above).
- Which round of the game best approximates “free trade?” (Answer: Round three).
- What lessons do students think this game teaches us about the debate over protectionism versus free trade? (Answer: Protectionism reduces our potential gains from trade, whereas free trade increases our potential gains from trade).
- If free trade is economically desirable, what factors might warrant restricting trade? (Note: This is a great time to discuss non-economic considerations like human rights concerns, environmental concerns, national security concerns, etc.).
– Is the case for free trade a unilateral one or a reciprocal one? That is, if other nations place trade restrictions on your nation’s exports, should you respond by imposing reciprocal restrictions on theirs? (Answer: The case for free trade is, perhaps surprisingly, a unilateral one—nations become richer when they remove restrictions on other nations even if those other nations do not return the favor).

4.7. The Role of Money in Trade

The lessons from this game can also be extended to other realms of economics besides international trade and finance. In money and banking classes, instructors can ask students: “What was the hardest part about playing this game?” At least one student will likely reply that the biggest obstacle is trying to find an ideal trading partner—someone who both has what they desire but also wants what they have and is willing to trade. Economists refer to this as the “double coincidence of wants” problem that plagues barter exchange, and it is arguably the greatest transaction cost that students encounter in the game.

Instructors can then ask their students: How could we more easily overcome this double coincidence of wants problem that plagues barter in real life? The answer is that we could overcome it more easily if we had some form of money—a commonly accepted medium of exchange that everybody was willing to accept in trade. This would open the door for the possibility of indirect exchange. Traders would no longer have to find someone who both has what they want and wants what they have. They could instead offer money in payment for the goods that they want to buy or accept money in exchange for the goods that they want to sell. Having some form of money as a vehicle for indirect exchange, therefore, reduces the biggest problem that barter economies must grapple with, this being the high transaction costs of finding willing and able trading partners.

As a further extension of this game, instructors can ask students to identify which of the five candies used in the game would be the most likely to emerge as money based on the five desirable traits of commodity money that are described in most money and banking textbooks:

1. Salability (popularity),
2. Portability,
3. Uniformity,
4. Durability, and
5. Divisibility.

If instructors use the five candies outlined earlier, Hershey’s Kisses or Peppermints typically win out in this poll in American classrooms. This is because they are relatively popular (salability), are easy to transport (portability), come in a single flavor (uniformity), are fairly durable (unless left out in the sun), and are easier to break into smaller pieces to make a change (divisibility).

5. Conclusion

International trade has been a central focus of economics since the inception of the discipline. Despite everything we have learned about the benefits of free trade since Adam Smith, the topic remains one of the most difficult for students to comprehend, especially in today’s climate, where global trade has grown greatly in size and complexity, and trade policy has also become polarizing. Given these circumstances, it is hard to overstate how effective non-traditional teaching methods like interactive games and experiments can help students grasp what might otherwise be very dense, politically fraught topics.

Many economic educators have used trading games to teach students about the benefits of trade (Becker & Watts, 1995; Dickie, 2006; Holt, 1999). Some have even used candy or various types of snacks as props (Emerson & Henderson, 2019; Henderson, 2018; Wolla, 2022). The Candyland Economics game takes these trading experiments a step further by requiring that students record their utility rankings at the outset of the game. Then, the exercise proceeds to break the students’ candy trading into a series of three structured rounds to illustrate the negative impact that trade restrictions have on an economy. This also allows instructors to discuss a wide range of topics that extend far beyond the realm of international trade, including discussion of the subjective theory of value, barter versus monetary exchange, the ideal properties of commodity money, etc. Future educators, both those teaching economics and international business, should be encouraged to adopt this trading exercise and build on it as they see fit. Hopefully, they will then share their findings and innovations with others. In doing so, economics and related courses can be made more relevant and entertaining (as well as delicious) and make these sometimes abstract concepts regarding international trade come to life with candy!

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Conflict of Interest

The authors declare that they do not have any conflict of interest in the research that underlies this article.

References


