CUTTING THE DIAMOND OF COMPARATIVE ADVANTAGE

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ABSTRACT

This paper addresses pedagogical issues pertaining to the principle of comparative advantage. It specifically advocates favoring output per unit of labor approach as opposed to the labor per unit of output for teaching the principle of comparative advantage. The output per unit of labor approach is preferred for its direct connections to opportunity cost, the ability to easily incorporate visual pedagogical tools, its connection to discussions of the role of theory, its ease of understanding, and its potential to increase student retention. The paper provides a specific example of the output per unit of labor approach. Suggestions for further research on the effects of the output per unit of labor approach are also included.

INTRODUCTION

David Ricardo left economists an intellectual legacy upon which the foundation for mutually advantageous trade rests. Comparative advantage stands as a monument not only to Ricardo, but also to the practice and methods of economics itself. In our attempts to help students to appreciate and embrace the principles of economics, teaching comparative advantage represents a splendid opportunity to display the logical method and power of economic theory.

The ramifications of comparative advantage on the overall levels of efficiency and wealth of an economy are well known to economists. Voluntary transactions based upon relative efficiencies in production serve to allocate resources more efficiently in a market economy. The populace of a modern democracy with an advanced, industrialized economy can ill-afford to ignore the advantages that accrue through specialization and exchange. Unfortunately, it is our observation that students often fail to understand comparative advantage as an important economic principle underlying the intellectual foundation for gains from trade. Another important reason to dispel confusion is that comparative advantage remains as a fundamental intellectual bulwark against protectionism. As nations continue to expand their roles in the international economy, an educated populace

must understand the tradeoffs that are made when any trading entity chooses to forgo trade.

The predominant method of presenting comparative advantage is based upon a labor per unit of output approach. In Ricardo's original work and in many leading undergraduate texts the first exposure to absolute and comparative advantage is often based upon this reference to labor productivity. It is our experience that students are easily confused in their initial exposure to comparative advantage due to the implicit reference to labor productivity inherent to the analysis. An alternative approach is to couch the initial exposure to absolute and comparative advantage - simply and directly - in terms of opportunity costs. This method is based upon the number of units of output per unit of labor and it links more directly to the conceptual foundations of the production possibilities curve. The logical difference is, for professional economists, a matter of simple conversion. However, we maintain that the pedagogical effects are significant.

The advantages of the alternative approach (output per unit of labor) are numerous. First, the output per unit of labor is firmly anchored in an even more fundamental principle in economics - opportunity costs. Opportunity costs are intuitively understood, lively examples abound, and students are able to relate their calculations to their personal experiences. Second, the approach directly incorporates a graphical exposition of the production possibilities curve. The complementarities between verbal and visual approaches are well documented. Saunders and Walstad (1990) provide a concise summary discussion of the relationship between visual and verbal modes of information processing in Chapter 7 - Learning Theory and Instructional Objectives.

Third, it is less obtuse to students. We have found that the approach better provides the opportunity to help students to understand the inevitable tradeoff between realism and applicability: a problem that haunts economics in the minds of many university and college students. Fourth, the approach begs a discussion of the labor per unit of output approach and does nothing to hinder a subsequent presentation of it. Fifth, and most importantly, it is our observation that students more clearly understand comparative advantage their retention of the principle and their ability to transfer it are improved.

Figure 1: Output per unit of Labor

	Pizza	Sundaes
Sue	3.00	4.00
Bert	2.00	6.00

An example of the method by which comparative advantage is presented under the output per unit of labor approach follows: Sue and Bert are going to throw a party and the menu consists of pizza and ice cream sundaes. First, we construct a matrix (figure 1) which presents the basic production information. The numbers within the matrix represent the quantity of items which each can produce using one unit of labor; in this case one hour. The matrix is clearly labeled as output per unit of labor and a brief explanation concerning the choice of labor unit ensues -- e.g., any labor unit can be used so long as both parties use the same measure.

Based upon the information in the matrix, Sue can produce either 3 pizzas or 4 sundaes and Bert can produce either 2 pizzas or 6 sundaes. Absolute advantage can be easily explained at this point. If Sue can produce three pizzas and Bert can produce only two, a direct comparison of the production capabilities of each reveals that Sue ought to produce pizza. If Sue can produce four sundaes whereas Bert can produce six, then a direct comparison of the production capabilities of each reveals that Bert ought to produce sundaes. Students are then asked to determine the trading patterns using the following production information. This is an exercise that lends itself well to a small group discussion context.

Figure 2: Output per unit of Labor

	Pizza	Sundaes
Sue	3.00	6.00
Bert	2.00	6.00

For pizzas, the production information is the same. Hence, there is no change in the production assignment. In the case of sundaes, however, a dilemma is presented, for the assignment of production is indeterminate under absolute advantage. Because absolute advantage is determined by external costs, and we are looking at the producible commodity across trading entities, we have yet in incorporate internal, domestic, or opportunity costs. To make a comparison based upon opportunity costs requires students to use comparative rather than absolute advantage.

In order to determine trading patterns, we must investigate foregone opportunities within each trading entity based upon internal or domestic costs. Students are reminded that under the concept of opportunity cost, the decision to use one's time to produce pizzas is, after all, simultaneously a decision to not produce sundaes and vice versa. The tradeoff can be made quite explicit by the graphical presentation of the matrix information revealing a constant cost production

possibilities curve. Students are reminded that the production possibilities curve for each trading entity holds constant the quantity of resources - specifically the one unit (hour, day, week, etc.) of labor.

Bert and Sue now decide to divide the work associated with their party based upon the principle of comparative advantage. Because each measurement is based upon the same labor unit, we can present their production decision in the following manner.

Sue	Bert
3 pizzas = 6 sundaes	2 pizzas = 6 sundaes
or	or
3/3 pizzas = 6/3 sundaes	2/2 pizzas = 6/2 sundaes
or	or
1 pizza = 2 sundaes	1 pizza = 3 sundaes

Reducing the equation in terms of pizza yields the fact that in the time Sue could make one pizza she must forgo the production of two sundaes, i.e., the production of one pizza has an opportunity cost of two sundaes. For Bert, the production of one pizza has an opportunity cost of three sundaes; in the amount of time Bert can make one pizza he must forgo the three sundaes he could have produced. If Sue must forgo two sundaes for producing one pizza whereas Bert must forgo three, then Sue is obviously the low-cost producer of pizzas. It would certainly be to their advantage to be giving up two sundaes rather than three sundaes for each pizza made.

What about the sundaes?

Sue	Bert
6 sundaes = 3 pizzas	6 sundaes = 2 pizzas
or	or
6/6 sundaes = 3/6 pizzas	6/6 sundaes = 2/6 pizzas
or	or
1 sundae = 1/2 pizza	1 sundae = 1/3 pizza

Reducing this equation yields the fact that producing one sundae has an opportunity cost of one-half of a pizza for Sue - in the time she can make one sundae she must forgo the production of one-half of a pizza. For Bert, the opportunity cost of producing one sundae is one-third of a pizza. If the cost to Sue of producing one sundae is 1/2 of a pizza while the cost of Bert producing one sundae is 1/3 of a pizza, then Bert is clearly the low opportunity cost producer. It would certainly be to their advantage to be giving up 1/3 of a pizza per sundae as opposed to giving up 1/2 of a pizza per sundae.

A number of other aspects can be easily incorporated into the discussion at this point. Nearly always included are: the irrelevance of the labor or trading unit chosen, the symmetry of the calculations for each party, and the political economy of trade. The later category offers two clear opportunities from a pedagogical perspective. First, one can easily address the multitude of issues that enter into real-world trade negotiations. Bargaining theory, international relations, public choice issues, and resistance to trade by some groups are all topics deserving discussion. Second, these topics nearly always act as a conduit into current issues that face our political decision-makers; hence, the discussion often taps into the students' existing "learning set".

Students can then be asked to determine exactly how many units of output Bert and Sue would need for their party. Regardless of the numbers chosen, it can always be shown that following comparative advantage is superior to its violation. For example, suppose that Sue and Bert have determined that they will need six pizzas and eighteen sundaes. Following comparative advantage, we would assign Sue the task of making pizzas and Bert the task of making sundaes. Sue would produce the six pizzas in two hours, and Bert would produce the eighteen sundaes in three hours. Thus, they spend five labor hours in preparation for the party. If we violate comparative advantage and have Bert make the pizzas and Sue make the sundaes, the preparation takes three and three hours respectively they will spend six hours performing the exact same task.

At times, students have questioned the "fairness" of the one-sided reduction in work effort. This can be treated as an opportunity to discuss the welfare implications of the principle of comparative advantage. When economists speak of the gains from trade, those gains accrue to the society - to the community as a whole. While there can be winners and losers at the sub-societal level, in a world of scarcity, the collective "we" can only benefit from trade. Certainly, a cursory review of trade negotiations points to the inevitability of issues of distribution being considered - but it also seems clear that comparative advantage is important enough to be considered on its own grounds -- namely, the efficacy of an economic system.

Numerous extensions of comparative advantage are possible. The horizontal expansion of the production information matrix allows one to demonstrate decreasing and increasing costs. Implicit assumptions concerning

subjects such as the employment levels and homogeneity of factors, varying cost conditions, and the labor theory of value impact the analysis and can be made explicit. Though, it is our experience that from a pedagogical perspective, it is better to address these issues in subsequent treatments of the relationships between these issues and comparative advantage. For instance, in one of the author's International Economics course, after absolute advantage is presented, he often produces a list of major problems and resolutions in turn. First, absolute advantage fails to provide a consistent explanation of trade patterns when one trading entity has the advantage in both products. Resorting to opportunity costs and comparative advantage solves this problem. Second, constant costs produce horizontal cost curves and complete specialization, which are unrealistic. This can be addressed through the introduction of the influence of the shapes of cost curves on trading patterns incorporating isoquant analysis and current theoretical discussions on the role of increasing costs. Third, the calculations are based solely on cost conditions: we are implicitly accepting the labor theory of value. Consistent use of the matrix approach allows one to easily extend the discussion to incorporate the average cost of production approach that is mutually determined by cost and demand conditions. In addition, the homogeneity of labor can be dropped as an assumption in this step. In international trade courses, the influence of exchange rates upon trading patterns can easily be made explicit.

A brief review of leading undergraduate textbooks reveals that a majority present comparative advantage using the labor per unit of output approach. One obvious research project would be to compare the effects of pedagogical approach on subsequent student knowledge of comparative advantage. Given that students face at least two sources of information in each course - the textbook and the professor - one would have to control for the approach of each. The widespread existence of standardized tests of economic knowledge (the Test of Understanding in College Economics) could be incorporated to test both short-term and long-term retention of the principle.

Another interesting research project would be to compare attitudes towards free trade, pre- and post-comparative advantage exposure. Again, controlling for the method of approach at the textbook and professor level would be important. Ultimately, if we are successful in teaching comparative advantage, its importance and relevance ought to be reflected in the attitudes of those exposed to its implications.

Though recent developments in international trade theory have attacked the static nature of Ricardian comparative advantage, a clear reading of this literature indicates that the crucial questions involve the conflict between static and dynamic analysis and the role of government intervention in the international trading system. It is not a question of whether or not comparative advantage is relevant. Krugman (1992) makes a strong case for continued use of comparative advantage for its

relative simplicity and for its predictive power. As a fundamental principle of economics, comparative advantage remains as one of the transcendent conclusions of economic logic with wide-ranging ramifications.

Current curricular reform movements call for rethinking traditional teaching methods and an increased awareness of economic knowledge among our populace. The area of international relations and international trade is often cited as one of particular concern for American students. Ignorance of the gains from trade and the concept of comparative advantage does not bode well for us in an era of increasing international economic activity.

As economists, it is important to subject our teaching methods to our cost-benefit criterion, in the attempt to increase pedagogical effectiveness. This paper calls for a specific and progressive order of approach in teaching the principle of comparative advantage, which is designed to increase student comprehension. It incorporates previously developed principles and tools, opportunity costs and the production possibilities curve, as anchors for student learning. It is also designed to allow for the subsequent relaxation of restrictive assumptions while making clear that specialization and trade lead to gains from the societal perspective.

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