

Chapter 2

The Origins of International Trade Theory

Summary We begin this chapter with the traditional definitions of mercantilism and the concept of Adam Smith’s absolute advantage (AA). The chapter then launches into perhaps the most vital cog in the demystification of trade and trade-related issues—the notion of comparative advantage (CA), as given to us by David Ricardo. Policymakers and analysts typically confuse absolute advantage with the foundational building block of global trade, comparative advantage, and this causes much confusion in discussions pertaining to global trade.

While most trade textbooks confine the discussion of CA to algebraic expressions and the standard England versus Spain case put forth by Ricardo,¹ we bring the definition and exploration of CA into a present-day context. We explicate the concepts of “opportunity cost” and “factors of production” and discuss the role of “factor intensity” in determining CA.

These concepts are reinforced by the simulated media article exercise at the end of this chapter. In all the cases in this book, the reader/student will be asked to relate the indicated passages in these cases/articles to key concepts covered in the chapter. These exercises highlight the pervasiveness of global trade theory and global macroeconomic policy in our daily business decisions and in our lives in general.

2.1 Mercantilism

From the sixteenth to the eighteenth centuries, **mercantilism** was the policy of Europe’s Great Powers as they expanded their empires, and was the universal framework by which international trade was understood. Mercantilism focuses on maximizing exports in order to bring “specie” (precious metals) into the country:

¹ David Ricardo explained his theory of comparative advantage using a two-country (England and Portugal), two-commodity (wine and cloth) example. We will examine the two-country, two-commodity model in this chapter.

The more gold and silver that a country accumulates, the richer it is. Imports are discouraged with heavy tariffs on foreign goods. Trade under mercantilism is a zero-sum game, with winners who win only at the expense of losers.

Huge spikes of inflation driven by increases in the domestic money supply (which accumulates as exports are exchanged for specie) would regularly ravage the countries that pursued mercantilist policies. It was David Hume, in 1752, who first articulated a theory to explain this phenomenon, which evolved over time to be known as the **quantity theory of money**.² Simply stated, increasing the amount of specie (money) in the economy does nothing to increase real wealth; instead, it just means that more money is required to trade for the same goods and services as before.

Whereas mercantilism is couched in a historical context here, it must be noted that the inherent spirit of mercantilism—in which exports and imports have normative implications, exports considered “good” and “job-losing” imports considered “bad”—has been alive and well through economic history. In fact, as economies slow down, the age-old spirit of mercantilism often rears its head.

Mercantilism has a dangerously intuitive and popular appeal. Free trade, as we will explicate in this book, unfortunately does not. Free trade is not intuitive; it is not easy to explain, and far less easy to successfully defend, particularly when living in the midst of a deep and enduring economic slowdown.

2.2 Absolute Advantage: Adam Smith

Adam Smith was the first to articulate the possibility that international trade is *not* a zero-sum game and that, in fact, a single-minded reliance on exports is counterproductive. He explained that different countries will use different quantities of resources in producing the same goods. Thus, each country should *specialize* in manufacturing only the good(s) that it can make with the fewest resources. Global output is thus maximized. Then, by trading freely, *each* trading country will end up with a greater quantity of goods than before.

We can see Smith’s theory in action with an example. Let’s consider a hypothetical world with only two countries:

Say we are given two countries A and B, where Country A is an efficient producer of coffee and Country B is an efficient producer of tea, and each has a

² David Hume’s 1752 essay “Of Money” may be readily found online, including at [http://www.econlib.org/library/LFBooks/Hume/hmMPL26.html#Part II, Essay III, OF MONEY](http://www.econlib.org/library/LFBooks/Hume/hmMPL26.html#Part%20II,%20Essay%20III,%20OF%20MONEY). The crux of his argument: “It seems a maxim almost self-evident, that the prices of every thing depend on the proportion between commodities and money, and that any considerable alteration on either has the same effect, either of heightening or lowering the price.”

Fig. 2.1 Absolute advantage

	Units of Labor	
	Country A	Country B
Good X Coffee	2 aL _x	3 bL _x
Good Y Tea	5 aL _y	4 bL _y

labor force of 100 workers.³ What does Adam Smith’s idea of absolute advantage (AA) tell us about the advantages of specialization and trade?

Let’s say that the labor requirements to produce coffee and tea in each country are as follows:

	Number of laborers to produce 1 unit of the good	
	Country A	Country B
Good X: Coffee	Two laborers	Three laborers
Good Y: Tea	Five laborers	Four laborers

We can see that in Country A, only two laborers are needed to produce 1 unit of coffee, whereas three laborers are required in Country B to produce that same unit. However, Country A requires five workers to produce 1 unit of tea, to Country B’s four.

The standard notation to indicate the quantity of labor required to produce a unit of goods is given by

$$aL_x = 2$$

↑

↑

↑

↑

Country A

Quantity of labor required to produce 1 unit of good X

Good X (Coffee, in this example)

“L” denotes Labor

The relationships are generally illustrated with a grid as shown in (Fig. 2.1).

³ At this point, we assume that the labor force is identical in Countries A and B and that factors such as transportation costs, infrastructure quality, and labor skills do not complicate matters. Later, as we ratchet-up our sophistication, we will bring in real-world elements, but for now, we concentrate on the pure bedrock theory.

Country A is said to have an **absolute advantage** in X (coffee), as it can make 1 unit of coffee with fewer units of labor than can Country B. Similarly, Country B is said to have an absolute advantage in Y (tea).

Were each country to devote 50 % of its 100 laborers to producing each good, the total global output would be

	Coffee (good X)	Tea (good Y)
Country A	25 units (50 laborers, $a_{Lx} = 2$)	10 units (50 laborers, $a_{Ly} = 5$)
Country B	16.67 units (50 laborers, $b_{Lx} = 3$)	12.5 units (50 laborers, $b_{Ly} = 4$)
Global output	41.67 units of coffee	22.5 units of tea

However, if each country specializes

	Coffee (good X)	Tea (good Y)
Country A	50 units (100 laborers, $a_{Lx} = 2$)	0
Country B	0	25 units (100 laborers, $b_{Ly} = 4$)
Global output	50 units of coffee	25 units of tea

We can see that world output of *both goods* is maximized if each country *specializes*. By trading freely, more of both goods are available to consumers in each country.

Of course, under specialization but without trade, Country A's consumers would have no tea, and Country B's consumers would have no coffee. This is why, to make Adam Smith's theory operational, the countries must trade freely with each other. Countries will produce and export those goods in which they have an AA and import the others.

But can we explicitly show that with the maximization of world output, both countries are actually better off? And what does "better off" really mean? And, most importantly, what happens if, say, Country A makes *both* coffee and tea with fewer resources than Country B? What then? The stage is set for the cornerstone model of free trade—the "engine room," if you will. Enter, David Ricardo.

2.3 Comparative Advantage: David Ricardo

The hitch with the theory of absolute advantage comes when we introduce Country C, which is neither the most efficient producer of coffee nor the most efficient producer of tea. Unfortunately for the disadvantaged Country C, it has no place in Adam Smith's theoretical world.



David Ricardo (1772–1823). Warren J. Samuels Portrait Collection, David M. Rubenstein Rare Book & Manuscript Collection, Duke University

Here, David Ricardo makes his invaluable contribution. In his *Principles of Political Economy* (1817), Ricardo considers a country's **comparative advantage** (CA) in producing a given good.

A country has a comparative advantage in the goods and/or services that it makes more efficiently than another country. To understand *more efficiently*, we must define the fundamental concept of **opportunity cost**.

Consider Countries A and B from our discussion above.

2.3.1 *Opportunity Cost*

Opportunity cost, from microeconomic theory, is simply the value of the forgone option. The opportunity cost of reading this chapter, for example, is the value of all the activities that were sacrificed for the time it took to read it. The opportunity cost is the “real” cost in microeconomic terms, as opposed to a cost given in monetary units.

In the example of the two countries cited earlier, we see that for the same labor required to produce 1 unit of tea (five laborers), Country A could instead produce $2\frac{1}{2}$ units of coffee (two laborers per unit). We can say that the opportunity cost to Country A of producing 1 unit of tea is $2\frac{1}{2}$ units of coffee.

Similarly, for each unit of tea produced by Country B, which requires 4 units of labor, it must sacrifice the production of $1\frac{1}{3}$ units of coffee, which requires 3 units of labor. B's opportunity cost to produce 1 unit of tea is $1\frac{1}{3}$ units of coffee.

	Country A		Country B	
	Units of Labor	Opportunity Cost	Units of Labor	Opportunity Cost
Good X Coffee	2 aLx	0.4 =aLx/aLy	3 bLx	0.75 =bLx/bLy
Good Y Tea	5 aLy	2.5 =aLy/aLx	4 bLy	1.33 =bLy/bLx

Fig. 2.2 Opportunity cost. Country A has an absolute advantage producing both goods X and Y, but B is *more efficient* than A, in terms of opportunity cost, at producing good Y

The real “cost” of good X should be measured in terms of the *opportunity cost* of other goods—in this case, good Y—that are given up to produce or consume 1 unit of good X.

The opportunity cost of producing 1 unit of good X in terms of good Y may be computed as the amount of labor required to produce 1 unit of good X divided by the amount of labor required to produce 1 unit of good Y. That is, **how much Y (tea) do we have to give up in order to produce 1 more unit of good X (coffee)?**

So the opportunity cost to Country A of producing 1 unit of good X (coffee) in terms of good Y (tea) is given by

$$\frac{aLx}{aLy} \quad (\text{units of labor required to produce 1 unit of X in A})$$

$$\frac{aLx}{aLy} \quad (\text{units of labor required to produce 1 unit of Y in A})$$

In Fig. 2.2, we see the opportunity costs to Countries A and B of producing each good, in terms of the alternative good. Each Country’s CA good is highlighted.

The relative efficiencies of each country in producing its advantaged good are illustrated here.

However, we already know that Countries A and B possess absolute advantages in producing coffee and tea, respectively. What about Country C, which is advantaged in *neither* coffee nor tea?

Let’s compare Country C, which we may take to represent a developing country with little infrastructure, to Country A, a relatively advanced country that is a more efficient producer of both goods (Fig. 2.3).

Country C is at an *absolute disadvantage* in producing both X and Y.

However, when we look at the *opportunity costs* to Countries A and C of producing each good, we find something interesting (Fig. 2.4).

For each unit of tea that Country A produces, it must sacrifice the production of 2.5 units of coffee. However, Country C can produce 1 unit of tea and sacrifice only 1.25 units of coffee. We can see that while Country C requires more labor than Country A to produce either good, Country C does enjoy an advantage over Country A in terms of its *relative* efficiency in producing good Y.

Fig. 2.3 Country A has absolute advantage in both goods X and Y

	Units of Labor	
	Country A	Country C
Good X Coffee	2 aLx	8 cLx
Good Y Tea	5 aLy	10 cLy

	Country A		Country C	
	Units of Labor	Opportunity Cost	Units of Labor	Opportunity Cost
Good "X" Coffee	2 aLx	0.4 =aLx/aLy	8 cLx	0.8 =cLx/cLy
Good "Y" Tea	5 aLy	2.5 =aLy/aLx	10 cLy	1.25 =cLy/cLx

Fig. 2.4 Opportunity cost determines comparative advantage. Country C, at an absolute disadvantage in both goods, is comparatively advantaged in the production of "Y" (tea)

This relationship is given by

$$\frac{cLy}{cLx} < \frac{aLy}{aLx}$$

$$1.25 < 2.5$$

That is, Country C's opportunity cost to produce 1 unit of Y (tea) in terms of X (coffee) is less than that of Country A. While it has no absolute advantage in either good, Country C enjoys a **comparative advantage** in producing good Y.

Similarly, Country A can be said to enjoy a CA in producing good X, as

$$\frac{aLx}{aLy} < \frac{cLx}{cLy}$$

$$0.4 < 0.8$$

It is a mathematical identity given two countries and two goods that each country will be comparatively advantaged in one of the goods.⁴ In other words, if we have

⁴The exception being identical factor requirements to produce the two goods in each country ($aLx = bLx$ and $aLy = bLy$). We explore this condition in Chap. 3.

two countries, A and C, and two goods, X and Y, and if Country C has a CA in Y (tea), then this automatically implies that Country A will have a CA in X. In this situation, *while a country may be able to have an absolute advantage in both goods, it cannot have a comparative advantage in both goods.*

We may define comparative advantage as follows:

Given two Countries A and B, producing two goods X and Y, **Country A is said to have a comparative advantage in good X if the opportunity cost of making 1 more unit of X in A (in terms of Y) is less than the opportunity cost of making 1 more unit of X in B (in terms of Y).**

2.4 Factors of Production: Labor and Capital

We have limited our discussion of comparative advantage thus far to the units of labor required to produce a given good. This conforms to Ricardo's original model.⁵ However, few industries require only labor to produce goods or even services. Labor (**L**), in fact, is only one of two basic **factors of production** in our application of Ricardo's theorem, the other being capital (**K**). In trade theory, we use the term "capital" to refer to a country's nonhuman productive assets, including plant and equipment, buildings, and infrastructure.

A country's gross fixed capital investment accumulates as a result of profitable enterprises and continued reinvestment of some portion of profits. Some countries make much more efficient use of capital than do others. Typically, as a country advances in technological sophistication, its employment of capital becomes increasingly efficient.

We will use labor in most of our early examples because it is simpler to conceive, since people are discrete units and more adaptable to movement between industries than capital assets, which are often specialized to a particular purpose.

We fully incorporate capital into our discussions in Chap. 4.⁶

⁵ Ricardo's model essentially held that the ratio of capital to labor was the same across industries in a given country. This has the effect of rendering capital as an irrelevant factor. Further, under the "labor theory of value" prevalent in Ricardo's day and to which he subscribed, the value of capital was determined by the amount of labor that went into creating it – therefore, we might say that capital was essentially a pass-through input representing additional, stored labor. The Ricardian model of trade was later expanded to explicitly include two distinct inputs, most thoroughly by Heckscher and Ohlin (see Chap. 5); we employ a two-input model as our basic framework.

⁶ As noted our basic Ricardian model assumes only two factors of production, labor (**L**) and capital (**K**). We discuss the relaxing of this assumption in Chap. 5.

2.4.1 Factor Intensity

We have defined “ a_{Ly} ” as the quantity of labor required to produce 1 unit of good Y in Country A. Similarly, “ a_{Ky} ” would represent the quantity of *capital*⁷ required to produce 1 unit of good Y in Country A:

$$a_{Ky} = 2$$

Quantity of capital required to produce one unit of good Y

Good Y (Automobiles, for example)

“K” denotes Capital

Country A

We use the term **factor intensity** to refer to the quantity of a given factor required to produce 1 unit of a good. Thus, “ a_{Ky} ” represents the capital *factor intensity* of good Y in Country A, “ b_{Lx} ” represents the labor factor intensity of good X in Country B, etc.

2.5 Ricardo's Simplifying Assumptions

This is a good place to note that David Ricardo, in order to simplify his explication of the basic premise of comparative advantage, made certain assumptions. Our Ricardian trade model initially incorporates these assumptions:

1. There are only two countries and two commodities.
2. There are only two factors of production, labor (L) and capital (K).⁸
3. There is perfect competition in all industries (including the factor market and the finished goods market).
4. Labor is all of the same level of skill and efficiency within each country.
5. Labor and capital are perfectly mobile within a country (and thus always able to fill any production need within that country) but cannot shift between countries.
6. There is free trade that involves no trade barriers or frictional transaction costs.
7. There are no transportation costs. Also, while not explicitly stated by Ricardo, it is implied that there are no environmental or infrastructure costs.
8. Production operates with constant returns to scale (“constant costs”).

⁷ Capital here is assumed to be quantifiable into discrete units. We can conceive of a “unit” of capital to represent a set of productive assets of a given value.

⁸ Please refer to footnote 5.

9. Both countries have identical technology, and technology is fixed, i.e., there is no technological change.
10. Each country fully utilizes all resources (labor and capital are fully employed).

We will relax some of these simplifying assumptions as we proceed in our analysis and will strip away all those that still remain in Chap. 5. We will find Ricardo's theory just as robust with these assumptions removed.

Simulated News Articles

At the end of this and the following chapters, we present a series of simulated news articles which serve to reinforce the key takeaways from the chapter. Key passages are lettered (a), (b), etc., and underlined. Explain and discuss the implications of each key passage in light of what you have learned in the chapter.⁹

Article 2.1. Trade Minister Makes Controversial Speech

Bryan McCausland, *Boston Trade Dispatch*

The Trade Minister of Athabaltic, Dr. Giles Mellonovich, made what some considered a speech “giving away” jobs to neighboring Carpatia. “The man has gone mad—this is a gigantic give-away of national employment to Carpatia! What about us?” cried Nadia Koznan of the Athabaltic Metalworkers Union.

Others, such as Professor Boris Koleslawsky of the University of Lower Kresnow, were somewhat sanguine. “Ah, the spirit of David Ricardo lives on—David is smiling on us today from his place in International Trade heaven,” he sighed dreamily, clutching his worn leather coat tighter around him as the biting wind raced through Stanislink Square.

Some crucial and controversial excerpts of the Mellonovich speech are presented here:

“My fellow Athabaltics, now that our neighbor Carpatia has emerged from her dark period of economic difficulties and (a) has embraced democracy, the free market, and the world community, I see a whole new and great chapter in the development of our beloved country.”

“I proclaim that we look carefully at our two biggest sectors of employment—electronics design and manufacturing. In electronics we are giants—our exceptional universities have created some of the brightest engineers and scientists, and

⁹The assignment is to “click on” the underlined passage—your answer should provide, in a few sentences, whatever context and explanations are necessary in order to clarify its meaning to one not as versed as you in international trade theory!

our best and brightest graduates head directly for electronics internships as their first preference nowadays. Manufacturing, while once the mainstay of Athabaltic, is something that we have to reexamine very carefully—we have to reevaluate our support for this sector in light of the teachings of the great David Ricardo and Adam Smith.”

(b) “I remember the Green declaration of last year, when this country wanted less pollution, and cleaner air and water. I also see that our children shun the lower paying manufacturing jobs. And I now see that the workers in neighboring (c) Carpatia are willing and able to do excellent manufacturing. In fact, if you remember, Carpatia was a manufacturing giant before it had its ‘troubles’ about 30 years ago. They have the skills, they have the hungry workers who are happy to do manufacturing work, and we have well-trained scientists and engineers who will be only too happy to sell them higher-end electronics products and buy their less complex manufactured goods from them. (d) We have a huge amount of resources, in both people and equipment, invested in the manufacturing sector, which could produce more output for our great country if it were better deployed to those areas where we are strongest.”

(e) “Consequently. I propose a national policy that will allow some of our big manufacturing companies to transfer manufacturing jobs to Carpatia and set up operations there.”

Fred Simplemodelz, President of the Steel Tubing and Sheet Metal Workers Association of Lower Metrovia, roared, “This is one great Betrayal! He is selling off the jobs of the ones who work the hardest! What sense does this make? (f) We can make both electronics and manufacturing with fewer workers than those people in Carpatia! Why bother with them at all!?”

We went back to Prof. Koleslawsky’s office, where he sat sipping a cup of tea while conferring with the eminent economist Dr. Pytor Murphysboro. “You see, the Trade Minister has his hands full. (g) Trade is not intuitive. It never has been. But trade is inevitable. It’s like water flowing downhill: It will find a way to flow. Nobody—nobody can stop it!”

“Yes, yes, bravo!” exclaimed Dr. Murphysboro, hungrily gulping down his lunch. “Someday I will tell you why I started a label factory in China!”

On this enigmatic and philosophical note, we headed to our favorite corner in the square to stand in line for the giant homemade mustard-infused hot dogs created by the great hot dog vendor known as Ivan the Great. Now his is one job that no Carpatian can do!

Hints and Solutions

Article 2.1

- (a) We will see in the next few chapters that one fundamental aspect of free trade is that it is endogenous—entirely market driven. Centralized planning, favored by nondemocracies, and overly regulated markets are not conducive to either free trade or the benefits thereof.
- (b) Through trade, countries typically move “up” over time from agriculture and mining raw materials to basic manufactures, to increasingly complex manufacturing, to engineering and design, and finally to services and “knowledge” work. Progress along this path is typically accompanied by improved quality of life and better environmental stewardship. We will explore this phenomenon in later chapters.
- (c) Carpatia, by virtue of a historic tradition of excellence in manufacturing, may easily have a comparative advantage in it.
- (d) This illustrates the concept of opportunity cost. The factors employed in manufacturing would be better deployed to electronics, where Athabaltic has a comparative advantage.
- (e) Athabaltic is making a conscious decision to “go global” and engage in trade with Carpatia, much like Premier Deng Xiaoping’s monumental decision to crack open the door and allow China to trade with the world in 1979. While controversial in party circles at the time, the results 30 years later speak for themselves.
- (f) Fred is clearly referring to the fact that Athabaltic may have an absolute advantage over Carpatia in both electronics as well as manufacturing.
- (g) It is not indeed. The notion of opportunity costs driving comparative advantage is not for the faint of heart.

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