Part II Core Theory: Classic International Trade Theories

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Part II Core Theory: Classic International Trade Theories

1. **Mercantilism and the Transition to Ricardo Theory of International Trade**
2. **Extensions and Tests of the Classical Model of Trade**

1. Mercantilism

It is collection of economic thoughts that came into existence in Europe during 1500 to 1750. It can not be classified as a formal school of thought, rather a collection of similar attitudes toward economic thinking and international trade.

Central to mercantilist thinking was the view that national wealth was reflected not by its productive capacity, in a country's holdings of precious metals. In addition, in this economic thinking, economic activity was regarded as zero sum game in which one country's economic gain was at the expense of another. Acquisition of precious metals thus became the means for increasing wealth and well-being and the focus of the emerging Europe.

In general, mercantilists are in favor of excess exports over imports or favorable trade balance. The doctrine resulted from the view surplus was equivalent to wealth or accumulation of precious metals and can be used to finance the state needs for money (say military). Also a positive trade balance will increase the money supply which will reduce unemployment.

In terms of government policy, mercantilists argue that government should control the use and exchange of precious metals (bullionism). In particular, countries attempted to prohibit the export of gold, silver and other precious metals by individuals and let the specie leave the country only out of necessity.

Governments also gave exclusive rights for certain routes or areas to specific companies. Trade monopolies fostered the generation of higher profits through

monopoly power. Profits would contribute to a positive trade balance and wealth of rulers (E.g. the Hudson Bay and Dutch East India Trading Company).

Governments controlled international trade activities with specific policies to maximize trade surplus. Exports were subsidized and high tariffs were placed on imports of consumption goods. Tariffs on imports of raw materials were kept low to support high value-added domestic manufacturing and exports.

Mercantilists also pursued policies that kept wages low. Since labor was the critical factor of production, low wages mean that production costs are low thus increasing the competitiveness of domestic goods. Since labor was crucial to the state, government stimulated a large population by various subsidies. To increase competitiveness, education is also subsidized.

Chapter 3 The Classical World of David Ricardo and Comparative Advantage

Mercantilism came under increasing attack by a group of economists political whose views eventually became known as the Classical school of economics. Hume's price-specie-flow mechanism argument and Adam Smith's proposition that with trade, two countries could benefit by specializing in goods in which they were more efficient were critical to the movement from protectionism to free trade. The movement was given more impetus by the work of David Ricardo, The Principles of Political Economy and Taxation (1817), which stressed that potential gains from trade were not confined to absolute advantage.

Often we take market-based economic system for granted without thinking how it is organized and functions. In fact, every economic system is characterized by two features: (1) specialization, in which each of us concentrates on a limited number of

productivities, and (2) exchange, in which most of what we desire is obtained by trading with others, rather than producing ourselves.

It is generally believed that specialization and exchange enable us to enjoy greater production, and higher living standards, than would otherwise be possible. As a result, all economies exhibit high degree of specialization and exchange.

The gains from specialization are mainly derived from three aspects: **developing expertise, minimizing downtime and exploiting comparative advantage**.

(1) This has to do with human capabilities. By specializing in a narrow set of tasks, we are more likely to become experts at one or two things, instead of remaining amateurs at a lot of things. It is easy to see that an economy of experts will produce more that an economy of amateurs.
(2) When people specialize and thus spend more time doing one task, there is less unproductive "downtime" from switching activities.

Adam Smith first explained these gains from specialization in his book *An Inquiry into the nature and causes of the Wealth of nations,* published in 1776. In fact, in explaining the efficiency of the production of a pin factory, Smith was not surprised by its sophisticated equipment, but by the division of labor among its workers. He wrote:

"In order to make a pin, one man draws out the wire, another straightens it, a third cuts its, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires three distinct operations; to put it on a separate business, to whiten the pins is another; it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner, divided into about 18 distinct operations, which, in some manufactories, are all performed by distinct hands… Ten persons could make among them upwards of forty-eight thousand pins in a day… But if they

had worked (wrought) separately and independently… they could (not each of them) have made twenty, perhaps not one pin in a day."

What is true for this pin factory can be generalized to the entire economy: even when workers are identically suited to various tasks, total production will increase when workers specialize.

Absolute Advantage and Comparative Advantage

The proposition of absolute and comparative advantage is usually obvious in the case of individuals. Suppose in a shipwreck, there are two survivors, Maryanne and Gilligan. They were washed up on a deserted island. Initially, they are unaware of each other, so each is forced to become self-sufficient.

Maryanne finds that it takes her one hour to pick one quart of berries or catch one fish as shown in the first row of the table below. For Gilligan, it takes him 1.5 hours to pick one quart of berries and three hours to catch one fish. The labor requirements per unit of production reflect the technologies that each individual has and imply the relative value of each commodity. Since both would want some variety in their consumption, we can assume that each would spend part of the day catching fish and part picking berries.

Suppose one day, Maryanne and Gilligan discover each other on the island. They decide to work together to their mutual benefit.

Table 1. Labor requirements for berries and fish

	Labor required for:

	1 quart of Berries	1 Fish
Maryanne	1 hour	1 hour
Gilligan	1.5 hours	3 hours

Absolute advantage: An individual has an *absolute advantage* in the production of some good when he or she can produce it using fewer resources (labor time in the example here) than another individual can.

On the island, the only resource used for production is labor. From Table 1 we can see that Maryanne has absolute advantage in both berry picking and fishing over Gilligan. She can pick on quart of berries and catch one fish using only one hour while it takes Gilligan 1.5 hours to pick one quart of berries and three hours to catch one fish. We can also say that Maryanne is more productive in both producing both goods than Gilligan, since she can pick berries and catch fish more quickly.

Two points should be noted. First, the concept of absolute advantage does not mean that an individual should have advantage in producing two goods. He may have absolute advantage in producing one good while the other party may have advantage in producing the other good.

Second, the above principle also holds true for countries, although people often lose sight of this fact.

Definition of absolute advantage: A country has an absolute advantage in good x if one unit of labor produces more x than is produced by one unit of labor in the other country.

We often hear arguments in China that to the effect that we should be producing certain good rather than importing it from abroad. Let's use country as examples to explain the concept of absolute advantage.

Suppose there are two countries in the world, the United States and China. Two gods are produced in this two country world, steel and automobiles. The number of tons of steel and cars that one person can produce is given in Table 2 below.

Table 2 one labor-year of production

Products	U.S.	China
Steel	30/year	20/year
Automobiles	40/year	10/year

Table 2 shows that in the United States, one labor can produce 30 tons of steel in one year while in China, one labor can produce 20 tons of steel in one year. For automobiles, in the United States, one labor can produce 40 cars in one year while in China 10 cars can be produced. In this case we say that the United States has absolute advantage in producing both goods.

Let's look at another case. We reduce the productivity of the U.S. in producing steel from 30 tons to 10 tons in one-labor year (Table 3 below).

Table 3 one labor-year of production

Products	U.S.	China
Steel	10/year	20/year
Automobiles	40/year	10/year

The U.S. is relatively more productive in automobiles, and China is relatively more productive in steel. (We can measure the productivities using the concept of opportunity cost. it can be shown that the opportunity cost of producing one more ton of steel is four cars in the U.S., but only 1/2 cars in China. (So China has an advantage in steel in the sense of being the low opportunity cost producer of steel.) This is also the case of absolute advantage, i.e., that U.S. has an absolute advantage in automobiles production and China has an absolute advantage in steel.

Problems of Using Absolute Advantage to Guide Allocation of Tasks

While international trade can take place on the basis of absolute advantage (as in the third example or trade between industrial manufacturers and raw-material-rich countries) gains from trade on the basis of comparative advantage can also occur. Therefore, if we use absolute advantage as the criterion for assigning work, we may not be able to explain the whole picture of the real world trade patterns.

In the third example, China has an absolute advantage in steel production and the U.S. has an absolute advantage in automobiles production. The determination of the trade pattern is easy. The U.S. should specialize in producing automobiles and China in steel.

For example, we move one worker in the U.S. out of steel production and into automobile production. Similarly, we move two Chinese workers out of automobile production and into steel production. Table 4 shows the changes in output after the reallocation. It demonstrates that simply moving the workers in each country into the industry in which the country has the advantage (its low opportunity cost industry) results in an increase in the world output of both goods. The countries may then engage in trade that leaves both better off.

Table 3 Changes in output due to reallocation of one worker

Goods	U.S. (1 worker)	China (2 workers)	Total
Steel	-10	+20	+10
Automobiles	+40	-10	+20

But in the first example, because Maryanne has an absolute advantage in both berry picking and fishing, she should produce both goods, and this however, would leave Gilligan doing nothing, which is certainly not in the pair's best interest.

Also in the second example, the U.S. has an absolute advantage in steel and automobile productions and thus it should produce both goods. This would leave China doing nothing.

In fact, Adam Smith believed that in above two cases there was no basis for trade between the two parties because one party is more efficient than the other in the production of both goods.

In general, absolute advantage is not a realistic guide for allocating tasks to different workers. This point was further clarified by David Ricardo in his book, The Principles of Political Economy and Taxation, which stressed that the potential gains from international trade was not confined to absolute advantage.

Ricardian Comparative Advantage

Assumptions of the Basic Ricardian Model

We first begin with the basic assumptions that underlie the modern expositions of the Ricardian model. Several of these assumptions are very restrictive and unrealistic, but will be relaxed later and do not invalidate the basic conclusions of the analysis.

1. Each country has a fixed endowment of resources, and all units of each particular resource are identical.

2. The factors of production are completely mobile between alternative uses within a country. This assumption implies that the prices of factors of production also are the same among these alternative uses.

3. The factors of production are completely immobile externally; that is, they do not move between countries. Therefore, factor prices may be different between countries prior to trade.

4. A labor theory of value is employed in the model. Thus, the relative value of a commodity is solely based on its labor content. From a production standpoint this implies that (a) no other inputs are used in the production process, or (b) any other inputs are measured in terms of the labor embodied in their production, or (c) the other inputs/labor ratio is the same in all industries. In simple terms, it means that a good embodying two hours of labor is twice as expensive as a good as a good using only one hour.

5. The level of technology is fixed for both countries, although the technology can differ between them.

6. Unit costs of production are constant. Thus, the hours of labor per unit of production of a good do not change, regardless of the quantity produced. This means that the supply curve for any god is horizontal.

7. There is full employment.

8. The economy is characterized by perfect competition. No single consumer or producer is large enough to influence the market; hence, all are price takers. All

participants have full access to market information, there is free entry to and exit from an industry, and all prices equal the marginal cost of production.

9. There are no government-imposed obstacles to economic activity.

10. Internal and external transportation costs are zero.

11. We initially confine our analysis to a two-country, two-commodity ‘world” to simplify the presentation of the basic Ricardian model. This assumption will be dropped later to make the model more realistic.

Comparative advantage: For an individual person to have a comparative advantage in some good, he must be able to produce that good with a smaller opportunity cost. Similarly, a country has a comparative advantage in a good if its opportunity cost of the good in terms another good is less than in the other country. A common principle to guide the division of labor is comparative advantage.

Let us start with our previous simple example of Gilligan and Maryanne. Table 4 shows the opportunity cost of both individuals to produce berries and fish. For Maryanne, catching one fish takes one hour, time that could instead be used to pick one quart of berries. Thus, her opportunity cost of one fish is one quart of berries. Similarly, her opportunity cost of one quart of berries is one fish.

For Gilligan, catching one fish takes three hours, time that he could instead use to pick two quarts of berries. The opportunity cost of one fish for Gilligan, then, is two quarts of berries, and the opportunity of one quart of berries id one-half of a fish.

Comparing the two numbers, we can see that Maryanne has a lower opportunity cost for one fish, so she has a comparative advantage in fishing. Gilligan has a lower opportunity cost for berry picking (half a fish). Therefore, while Gilligan has an absolute advantage in nothing, he has a comparative advantage in berry picking.

Table 4 Opportunity costs

	Opportunity cost of:	
	1 quart of Berries	1 Fish
Maryanne	1 fish	1 quart of berries
Gilligan	1/2fish	2 quarts of berries

Let's see what happens as the two decide to move toward specialization according to comparative advantage.

From Table 4 we know that if Gilligan decides to catch one fewer fish, he could free up enough time to pick 1 quarts of berries. We can write down the results for Gilligan's production in this way:

Gilligan: Fish 1 (*Down*) ⟹ Berries 2(*up*)

If Maryanne decides to catch one additional fish, she must sacrifice 1 quart of berries:

Maryanne: Fish 1 (*up*) ⟹ Berries 1 (*down*)

Now we see what happens to total production on the island each time the pair moves toward producing according to comparative advantage. In this case, the two will move toward specialization.

Gilligan gives up fishing which will be made up by Maryanne, so Maryanne specializes in fishing. Since Maryanne will produce no berries, and all berries will be produced by Gilligan, so Gilligan would specialize in picking berries.

Table 1.5 Total production before and after specialization

	Before specialization	After specialization
Maryanne	2 fish and 2 quarts of berries	4 fish
Galligan	1 fish and 2 quarts of berries	4 quarts of berries

Previously before specialization, suppose that Maryanne catches two fish and two quarts of berries. Gilligan catches one fish and two quarts of berries.

After specialization, Maryanne shall give up the production of berries. By giving up two quarts of berries she can produce two additional fish. In total, Maryanne will produce four fish.

For Gilligan, he will specialize berry picking. By giving up one fish, he can produce two additional quarts of berries. In total he will produce four quarts of berries.

Now on the island, there are four fish and four quarts of berries as compared with three fish and four quarts of berries. So we can conclude:
Total production of goods and services will be the greatest when individuals specialize according to their comparative advantage. This is an important reason why specialization and exchange lead to higher living standards than self-sufficiency.

What is true for Maryanne and Gilligan is also true for the whole economy. If an economy organizes its production according to the principle of comparative advantage and let the producers exchange their products, its total output would increase significantly.

Now we use the textbook example to explore the ideas related to the comparative advantage more formally.

Ricardo noted that while international trade can take place on the basis of absolute advantage, given the international immobility of the factors of production, gains from trade on the basis comparative advantage can occur as well. To make his point, Ricardo presented a case describing the production of two commodities, wine and cloth in two countries, England and Portugal. The labor requirements per unit of production are given in table 6.

Table 6 Ricardian Production Conditions in England and Portugal

	Wine	Cloth	Price ratio in Autarky
Portugal	80hrs./bbl.	90hrs./yd.	1W:8/9C (or 1C:9/8W)
England	120hrs./bbl.	100hrs./yd.	1W:6/5C (or 1C:5/6W)

In this example, Portugal can produce both goods more efficiently than England. According to Adam Smith, there is no basis for trade between the two countries.

But Ricardo noted that Portugal is relatively more efficient in the production of wine than cloth, and England has a smaller disadvantage in the production of cloth. Because of the difference in labor requirements (relative cost differences), there is an opportunity for more output to be produced.

Autarky Price Ratios: As shown in the table, before trade, 1 wine could exchange for 6/5 yards of cloth (based on the labor content) in England. In Portugal, 1 wine could exchange for only 8/9 yards of cloth.

If Portugal specializes in wine production it can sell wine to England at a price of 1 wine: 6/5 yards of cloth, while at home 1 wine can only exchange for 8/9 yards of cloth.

Similarly, England could specialize in producing cloth and exporting the cloth to Portugal in exchange for wine. In this case, with 1 yard of cloth it could receive, at the Portuguese price, 9/8 barrels of wine. But at home 1 yard of cloth could only sell for 5/6 barrels of wine.

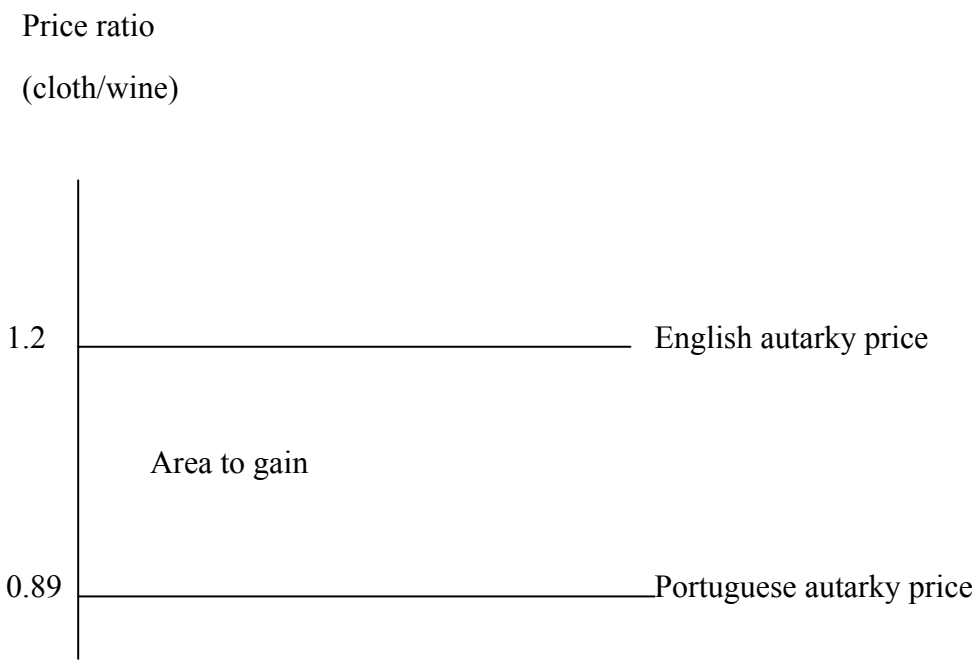
Obviously, both countries gain through specialization and trade. The example shows that although one country may have absolute advantage in producing both goods both countries can gain through specializing according to comparative advantage. The basis for and the gains from trade depend on comparative, not absolute advantage.

Very often we hear people say that we should produce the goods on our own instead of importing them from abroad. They believe that doing so is patriotic. However, this view contradicts Ricardo's theory of comparative advantage. Who is right and who is wrong?

Price Ratios and Gains from Trade: To examine the gains from trade, let us explore the price ratios further.

With autarky, the relative price in England is: 1 wine exchanges for 1.2 (6/5) yards of cloth. So England would be happy to have a price ratio that could buy one barrel of wine with less than 1.2 yards of cloth.

With autarky in Portugal, the relative price is: 1 wine exchanges for 0.89 (8/9) yards of cloth. Portuguese would be happy if they can sell one barrel of for more than 0.89 yards of cloth.



The graph illustrates that if the British can buy the wine at a price less than 1.2 and the Portuguese can sell the wine at the price above 0.89, both can gain.

Ricardo did not examine the precise determination of the international trade price ratios or the terms of trade. But the important point is that after trade, there will be a common price of wine in terms of cloth in the two countries.

To see this point, we can imagine that after trade, since wine is coming into England and (with the new supply) and Portugal is buying from England the cloth (new demand), the relative price of cloth in terms of wine will rise in England.

In England: implying the price ratio (wine/cloth) after trade. ↑

In Portugal, because cloth is coming from England and England is buying more wine from Portugal, the relative price of cloth in terms of wine will fall.

In Portugal: price ratio (wine/cloth) after trade ↓

In this process, the pre-trade ratios of 1W: 1.2 C in England and 1W:0.89C in Portugal

converge toward each other through trade. Eventually, a single price will prevail in the markets of the two countries.

To illustrate the gains from trade, Ricardo arbitrarily assumed that the price ratio after trade was 1W:1C., in this case, England could devote 100 hours of labor for producing cloth and get 1 C. This 1 C could then be exchanged with Portugal for 1 W. Thus, 100 hours of labor in England have indirectly produced 1 unit of wine. If England had chosen to produce 1 W at home, the labor cost would have been 120 hours. This is called an indirect way to wealth. The 1 unit of wine has not been produced by the British, but by the Portuguese. Trade has saved England 20 hours of labor for each unit of imported good. Instead of expressing the gains from trade in terms of labor time saved, another way to state the same result is that with trade more goods can be obtained for the same amount of labor time than is possible in autarky.

There is obviously a gain from trade for Portugal in terms of labor saved. Portugal can take 80 hours of labor and produce 1 unit of wine. With the 1W Portugal can obtain one unit of cloth through trade. Direct production of 1C in Portugal would have required 90 hours of labor; trade has enabled Portugal to gain or save 10 hours of labor per unit of its imported good.

Thus, unlike the zero-sum game of the Mercantilists, trade is a positive sum game.

The above example shows that the price ratios are important for the distribution of gains from trade between the two countries. In general:

> **The closer the price ratios are to a country's internal autarky price ratio, the smaller the gain for that country from international trade.**

The Equilibrium Terms of Trade: those that bring about balanced trade (exports=imports) for each country. If the Ricardian ratio 1W:1C left Portugal with a balance of trade surplus, the terms of trade would shift toward more expensive wine,

say 1W: 1.1C,. This shift occurs because the price-specie-flow mechanism raises prices and wages in the surplus country, Portugal, and depresses the prices in the deficit country, England.

The essence of Ricardo's argument is that international trade does not require different absolute advantages and that it is possible and desirable to trade when comparative advantages exist.

A comparative advantage exists whenever labor requirements differ between the two countries commodities. The difference in labor requirements implies opportunity cost of the two commodities and thus the internal price ratios are different. The difference in price ratios will generate opportunities to trade, which will benefit both countries.

Resource Constraints:

Now we incorporate the resource constraint into the analysis. Suppose that Country A has 9000 labor hours available and Country B has 16,000 labor hours. With the information in Table 7 below, we can establish the production possibilities open to both countries in autarky.

Table 7. Ricardian Production Characteristics

	Cloth	Wine	Autarky Price Ratios
Country A	1hr./yd.	3hrs./bbl.	1W:3C
Country B	2hrs./yd.	4hrs/bbl.	1W:2C

In Table 7, Country A has a comparative advantage in cloth as the relative labor costs between the two countries (1/2) is less than that in wine (3/4). The basis of trade is also evident in the fact that the autarky price ratios are different. Trade will take place between the autarky prices in two countries.

Country A can produce 9000 yards of cloth and no wine, or 3000 barrels of wine and no cloth, or any other combinations of both goods that absorbs the 9000 hours of labor available in the economy.

With 16,000 labor hours available, Country B can produce 8000 yards of cloth and no wine, or 4000 barrels of wine and no cloth, or any other combination of these goods given the availability of total labor.

Suppose:

- Country A produces 6000 yards of cloth and 1000 barrels of wine prior to trade;
- Country B produces 3000 yards of cloth and 2500 barrels of wine.
- The relative price is 1W:2.5C.

Suppose also that country A exports 2500 yards of cloth in exchange for 1000 barrels of wine from country B, but the two countries do not alter the production. How will the pre-trade and post-trade scenarios compare?

Prior to trade, country A produced and consumed 6000C and 1000W that exhausted all the available labor hours (9000). After trade, country A consumes 3500C (6000 cloth produced –2500 cloth exported to country B) and 2000W (1000 wine produced at home +1000 wine imported). This consumption bundle would require 9500 labor hours if produced at home. Country A thus has gained the equivalent of 500 labor hours (9500-9000) through trade.

What about country B? Prior to trade, it produced and consumed 3000 yards of cloth and 2500 barrels of wine that exhausted 16000 available labor hours. After trade, country B consumes 5500 yards of cloth (3000C domestically produced+2500C imported) and 1500 barrels of wine (2500Wine produced at home-1000W exported). This combination would need 17000 labor hours (5500X2+1500X4) if produced at home. So country B has gained the equivalent of 1000 labor hours (17000-16000)

through trade.

Complete Specialization:

In the above example trade has not altered the production pattern of cloth and wine in the two trading partners. When trade takes place, countries will specialize in the production in which they have the comparative advantage.

Assume that country A produces only cloth and B produces only wine, a case of complete specialization. As already known, A can produce 9000 yards of cloth and B produce 4000 barrels of wine. They exchange 2000 barrels of wine for 5000 yards of cloth.

In this instance, country A would consume 4000 cloth (9000C-5000C exported) and 2000W (all imported). This consumption bundle would have a labor value of 10,000 labor hours (4000X1+2000X3) in country A, which is greater than the labor value of consumption in either autarky or in the case of trade with no production change.

Country B is also better off because it now consumes 5000 yards of cloth (all imported) and 2000 barrels of wine (4000 barrels produced-2000 barrels exported) with a labor value of 18000 hours (5000X2+2000X4). This contrasts with a labor value of 16000 in autarky and 17000 in incomplete specialization.

Classical writers concluded that if there is a basis for trade, it automatically leads to a country toward complete specialization in the commodity in which it has comparative advantage. Consumption remains diversified across goods as dictated by consumer preference.

Technological take over by less developed countries

It is generally observed that lagers can always catch up the leaders because the lagers are believed to have a comparative advantage by concentrating on the technology that leaders have devoted few resources. Reference:

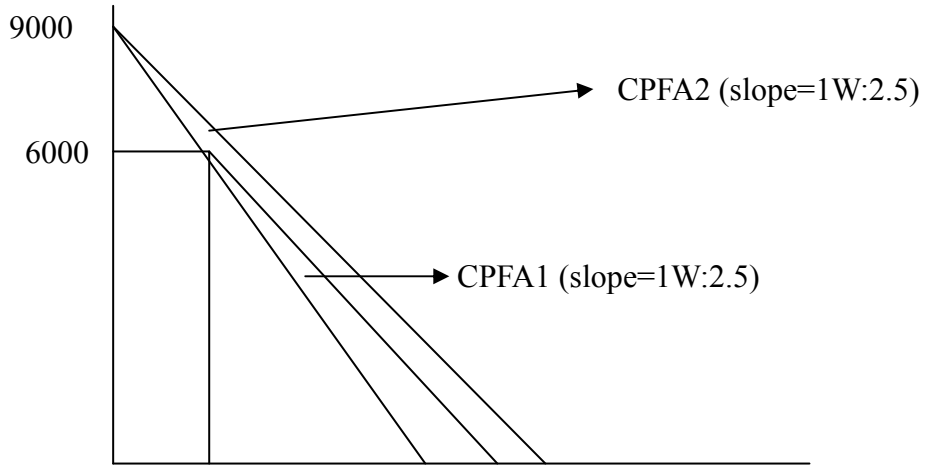
Production Possibilities:

The basis for trade and the gains from trade can also be demonstrated by the concept of production possibilities frontier.

We use Table 7 above to graph the production possibilities frontier.

Country A

Cloth	Wine
9000 yds.	0 bbl.
7500	500
6000	1000
4500	1500
3000	2000
1500	2500
0	3000



1000 3000 3600

The production possibility curve is a straight line because of the constant costs assumption. The slope of the PPF reflects the opportunity cost in autarky.

As shown country has a pre-trade combination of 6000 yards of cloth and 1000 barrels of wine. The slope of the PPF or the opportunity cost is 1W : 3C. Without trade, for A to be able to obtain 1 unit of wine it has to give up 3 yards of cloth. But with the trade, the price ratio was 1W : 2.5C. So A was able to obtain 1 unit of wine for only 2.5 yards of cloth. The new price ratio is represented by CPFA1 with trade which begins at initial production point. By participating in trade, A can obtain a consumption bundle that lie outside the PPF. The further the new consumption-possibility curve lies outside the PPF the larger the gains. With the complete specialization in cloth, the largest set of consumption possibilities occurs (see CPFA2). In this case it can export 9000 yards of cloth in exchange for 3600 wine (9000/2.5).

The situation is similar to for country B.

Production and consumption in autarky was initially at 3000 yards of cloth and 2500 wine. With the trade, B can obtain 2.5C for 1 W, instead of only 2C at home. B faces a steeper price ratio (CPFB1), with no production changes. Trade allows B to consume outside its PPF. The largest potential consumption combinations for given terms of trade occur when B produces only wine and imports all its cloth. For example, at maximum if B exports all 4000 barrels of wine it could obtain 10,000 yards of cloth (4000X2.5=10000).

Country B	
Cloth	Wine
8000 yds.	0bbl.
7000	500
6000	1000
5000	1500
4000	2000
3000	2500
2000	3000
1000	3500
0	4000

Complete versus Partial Specialization

The constant cost assumption would lead to complete specialization in production in both countries. But under increasing costs, trade would only lead to partial specialization.

So partial specialization occurs under the assumption of increasing costs. This is because under this assumption, unit costs increase as both countries produce more and more of their export goods. Thus, increasing costs give rise to a mechanism that equalizes costs in both countries. So after cost differential ease to exist, the basis for continued specialization is eliminated.

Complete specialization generally takes place under constant costs assumption. The only exception to complete specialization under constant costs assumption is in the case of a small country trading with a large country. In this situation, only the small country specializes completely in the production of the commodity in which it has a comparative advantage. The large country continues to produce both goods, even with

international trade.

The case of a small country

If a country is too small, it is not able to satisfy all demands of its trading partner. Suppose we have France and the United States as trading partners. If France were too small to meet the entire US demand, say, for 50 gallons of wine, then the France would specialize completely in the production of wine in which it has a comparative advantage. The US, on the other hand, would continue to produce both commodities wine and cotton, even with international trade. However, the relative price between the two countries would be equal to the US pre-trade ratio (Pc/Pw=0.5). As a result, France would capture the entire gain from trade.

As it is shown in the graphs, France's autarky location is at point A' where the country is producing and consuming 10 gallons of wine and 15 bales of cotton. The US pre-trade location is at point A, where it is producing and consuming 40 gallons of wine and 100 bales of cotton. Because the relative price ratio in France is (Pc/Pw=2), France would specializes completely in the production of wine moving to point P' on the PPF. Then by exchanging 10 gallon of wine for 20 bales of cotton with the US, France can end up consuming at C'. At this point, France gains 20 gallons of wine (30-10=20) and 5 bales of cotton (20-15=5) compared to pre-trade A'.

With the international trade in place, the US moves to from point A to point P, producing, producing 30 gallons of wine and 120 bales of cotton. Then by exchanging 20 bales of cotton for 10 gallons of wine with France, the US ends up consuming at point A as it did before trade. In this case the US does not gain from trade with France.

The question is why would the US engage in trade if it did not gain anything?. It can

be answered only we look at more realistic picture, that is assuming that there exists at least one other large country, say China, that has a comparative advantage in cotton production. In this case, the after-trade relative price would be determined jointly by the demand and supply in both countries. Both countries the US and China would gain from trade. France would enter the market trading at the prevailing relative price ratio and would reap all the benefits from its own trade. But France would run a risk with complete specialization as if there is reduction on international demand the French economy may be in difficulty.

Some concluding observations

So far we have not said about the basis for the comparative advantage the country may have in trade. Indeed the classical theory does not offer a satisfactory explanation of why production conditions differ between countries. The costs resources between nations are generally taken as given. Adam Smith thought that participation in foreign trade could be a strong positive force for development. He argued that export markets could enable a country to use resources that otherwise would remain ideal. The resulting movement to full employment would increase the level of economic activity and allow the country to acquire foreign goods to enhance consumption and investment and growth.

Ricardo and subsequent classical economists argued that the benefit from trade resulted not from the employment of underused resources but from the more efficient use of domestic resources which came about through the specialization in production according to comparative advantage.

Besides the static gains resulting from resource allocation, economists such as John Stuart Mill pointed out the dynamic effects of trade that were of critical importance to a country's economic development. These included the ability to acquire foreign

capital and foreign technology and the impact of trade and resource allocation on the accumulation of savings. In addition, the benefits associated with increased contact with other countries and cultures could help break the binding chains of tradition, alter wants and stimulate entrepreneurship, innovations and inventions.

The economic growth and development propelled by trade can of course generate some undesirable consequences. Specialization in production that have few links to the rest of the economy can lead to unbalanced pattern of growth and do little more than produce an export enclave, a result that often negate (offset) the dynamic effects of trade.

Thus, the classical writers have made us aware that trade not only produce static gains but also can be a positive vehicle for economic growth and development. Any country can benefit from trade in which some foreign goods can be purchased at prices lower than at home, even if it is absolutely less efficient in the production of all goods compared to a more developed trading partner.

2. Extensions and Tests of the Classical Model of Trade (chapter 4)

The usefulness of comparative advantage is not restricted to the two-commodity barter world. Useful insights and valuable tuition about the nature and structure of trade can be gained by some relatively simple extensions of this model. In the following discussion, the model is made more realistic by incorporating wage rates and exchange rates. This exercise permits us to analyze trade in terms of money and prices to examine rigorously the role of wages, productivity and exchange rates in influencing trade patterns.

2.1 The classical model in money terms

We modify the model from one of the labor requirements per commodity to a monetary value of the commodity. This is a logical extension because of the transactions even in Ricardo's time, were based on money prices and not barter. The way to do it is to multiply the labor requirement per unit of product by the wage rate.

Labor requirements and money prices in a Ricardian Framework

	Wage/hour	Cloth		Wine	
		Labor/unit	Price	Labor/unit	Price
England	£1/hr.	1hr./yd.	£1	3hrs./bbl	£3
Portugal	0.6esc/hr.	2hrs./yd.	1.2 esc.	4hrs./bbl	2.4 esc.

As we already know that England has the absolute advantage in the production of both goods. Assume that the exchange rate is 1 escudo=£1. In England the labor requirement per unit of cloth is 1 hour as before. The hourly wage rate is 1 pound. Give labor cost is the only cost component in the product, the price of the product is 1 pound.

The pattern of trade responds to the money price differences. As the exchange rate is 1 escudo=£1, cloth will be purchased in England because the price of cloth in either currency is less in England (1£/yard or 1 escudo/yard) than in Portugal (1.2 escudo/yard or 1.2£/yard).

Wine, however, is cheaper in Portugal, so customers will buy Portuguese wine. This result is the same as that reached in the examination of relative labor efficiency between the two countries (that is England should export cloth and import wine since $1/2 < 1/4$).

The monetizing of the model provides additional piece of information: Once prices and exchange rates are specified, the international commodity terms of trade are uniquely specified. As shown in the table price of cloth is low in England 1£/yard or 1 escudo/yard while the price of wine is low in Portugal. So trade can take place between the two countries. England would export cloth and import wine while Portugal would export wine and import cloth.

In this case, the price ratio P_{wine}/P_{cloth} is (2.4/1), showing the quantity of cloth that exchanges for 1 barrel of wine. These are clearly viable terms international terms of trade because they lie within the limits imposed by the prices under autarky in the two countries. If there is a trade imbalance either gold will in or out of the country or the exchange rate will adjust according to the price-specie-flow mechanism.

2.2 Changes in wages and exchange rates

In the monetized version of the classical trade model, the cost condition necessary for a country to export is (England as country 1 in the example):

$$a_{1j}\, W_1\, e = a_{2j} W_2$$

a_{1j} = unit labor requirement for commodity j in country 1.
W_1 = wage rate in country in country 1's currency;
E = exchange rate expressed in terms of 2's currency per unit of 1's currency-escudos/pound;
a_{2j} = unit labor requirement for commodity j in country 2;
W_2 = wage rate in country 2 in 2' currency

It is clear that England the labor cost in England for cloth is lower since (1 hr) •(£1/hr.) •(1esc./£1) < (2 hrs.) •(0.6 esc./ hr.). So England should export cloth. For

wine however, it is different. The cost of wine is higher in England than in Portugal since (3 hrs) •(£1/hr.) •(1esc./£1) > (4 hrs.) •(0.6 esc./ hr.). So England should import wine and export cloth.

The export (cost) condition is a useful way to examine potential trade flows. It makes clear with this monetized model that the ability to export depends not only on the relative labor efficiency but also on the wage rates and exchange rates. Shifts in wage rates and exchange rates can affect trade. The above export condition is rewritten in the following way:

$$a_{1j}/a_{2j} < W_2/(W_1 \,.\, e)$$

A fall in W_2 reduces the relative competitiveness in country 1 whereas a fall in W_1 enhance the its cost competitiveness. Similarly, if the pound rises in value (a rise in e) would increase the cost of English goods, thus offsetting England's initial relative labor efficiency in cloth.

Since the changes in the wage rate can alter the degree of cost advantage to a country, changes that are too severe could eliminate a country's ability to export or its willingness to import a good. A country would lose its ability to export if wages rose sufficiently to cause the domestic price to exceed the foreign price. The same country would have no desire to import a good if its wage rate fell to the point that the price of the import good was cheaper at home than abroad. Thus, the home wage rate must lie within a certain range if trade is to take place by comparative advantage.

We adopt the Portuguse wage rate (0.6 esc./hr.) and the exchange rate from the example, and if the English wage for cloth production rises from (£1/hr.) to (£1.2/ hr.), the price for cloth in England would be in Portuguse currency would be (£1.2/hr. •1hr/yard •1esc./£= 1.2 esc.). It indicates that the prices for cloth would be equalized between the two countries and England lose its guaranteed market.

However, if wages in England fall to £0.8/hr., the cots of its wine production is equalized between the two countries as (£0.8 • 3hrs./bbl • 1esc/£ = 2.4 esc./bbl) and England would have no incentive to import wine from Portugal. The wage limits for England are £1.2/hr and £0.8/hr. Similarly for Portugal they are 0.5 escudo/hr. and 0.75 escudo/hr. . At 0.5 escudo per hour the price is equal to 1 escudo/yard and is equalized between the two countries for cloth. At 0.75 esc./hr. the price for wine is (0.75 esc./hr • 4 hrs./yard = 3 esc.) equalized between the two countries.

Similarly, there are exchange rate limits. Using the wage levels in the England and Portugal example, an exchange rate of 1.2 esc./pound will cause the price of cloth in both countries to be the same. On the other hand, an exchange rate of 0.8 esc./pound will cause wine prices to be equalized in both countries. For trade to take place, the exchange rate must lie within these limits between 1.2 esc./pound and 0.8 esc./pound.

The limits to wages and exchange rate can also be determined by using the export condition explained above and shown in the textbook.

It may have been noticed that the range of wages in England is above the range of wages in Portugal. It is no accident: the higher productivity country will have more highly paid workers. If Portuguse workers sought to equal wages to those in England, Portugal would be unable to export either good and would import both. The price-specie-flow mechanism would then operate to reduce Portuguse wages until they fell within the specified range.

2.3 Multiple commodities

The discussion so far has focused on the case of two commodity and two-country framework. In the real world trade would involve more than two product. The concept of comparative advantage can be extended into a larger group of products.

Unit production conditions in a two-country, multicommodity Ricardian Framework

	Wage/hr	Wine	Cutlery	Cloth	Hardware	Wheat	Cheese
Spain	2 pesetas	4 hrs	12 hrs	6hrs	15 hrs	5 hrs	7 hrs
Germany	3.2 marks	3 hrs	4 hrs	5 hrs	6 hrs	2.8 hrs	3 hrs

Suppose the exchange rate is 0.8 marks/1 peseta. In this situation, the relative labor requirement , (a_{1j}/a_{2j}) must be less than $W_2/(W_1\ e)$ in order for Spain to export the good.