# Ricardo Through the Looking Glass: (Mis)adventures of Comparative Advantage in Developing Economies

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## Abstract

Suppose two countries, A and B, produce two commodities: trains and bananas. However, country B is less technologically advanced and is capable of producing only steam engines, while country A manufactures high-speed trains. As a result of this technological advantage, country A has a clear comparative advantage in trains, while the comparative advantage of country B is, therefore, in bananas. According to Ricardian theory, free trade, where country A specializes in trains and country B specializes in bananas, increases world output. However, will country B benefit from this Ricardian specialization? We aim to provide the simplest possible two-country two-commodity model with the smallest possible set of assumptions, which shows that specialization does not always benefit all trade participants. Rather, one of the participants may get a disproportionate benefit from trade at the expense of the other.

Keywords: comparative advantage, free trade, Ricardian theory, specialization

## Introduction

Ricardo's comparative advantage principle shows how trade based on comparative advantage and specialization results in the most efficient use of world resources. The argument for free trade goes further—not only the welfare of the world as a whole but also the welfare of each participating nation increases.

However, there is growing evidence that expanding free trade causes the income gap between developed and developing nations to grow rather than shrink (Hausmann & Rodrik, 2006). Eric Reinert argued that this growing income gap is a direct consequence of comparative advantage (Reinert, 2019). Less developed countries possess comparative advantage in sectors with the least sophisticated technologies. Specializing in sectors or industries with the lowest added values, developing countries cannot catch up with industrial nations. In a developing country, the comparative advantage is a looking-glass reflection—everything works in reverse.

One illustration of this effect is Graham's dynamic theory of uneven economic growth (Reinert, 1996). There are two countries and two commodities, each of which uses its own technology, and the country's specialization is in accordance with its increasing or diminishing returns. The world growth is distributed unevenly—the rich are getting richer and the poor are getting poorer.

However, we can show that even a simpler set of assumptions can demonstrate the main idea. The requirement of increasing or diminishing returns is not necessary to illustrate that comparative advantage can lead to a country's economic loss. Our very trivial illustration can be used, we believe, as a simple introductory example at any level of international trade.

**Results**

Consider the following two-country two-commodity model.

1. The world consists of two nations, each of which is producing two commodities.
2. Each nation has a fixed endowment of labor, and labor is fully employed and homogeneous.
3. Labor can move between industries within a nation but cannot move between nations.
4. No government barriers to trade exist.
5. Transportation costs are zero.
6. Trade is balanced, there are no flows of money between nations.

However, we will add minor modifications to the standard Ricardian assumptions. These modifications allow us to consider two types of goods: high-technology and commodity goods.

7. The level of technology was *not* fixed for both nations. Different nations use different technologies, *and* different firms *within each nation* utilize different production methods for each commodity.
8. Wages in each country are contingent upon the industry. The higher-productivity industry does not subsidize the lower-productivity industry.

Before specialization, two countries, the United States and Russia, produce laptop PCs and chairs. This table was inspired by Thomas Sowell's illustrations (Sowell, 2015).

| Products | American workers | American output | Russian workers | Russian output | World output |
|---|---|---|---|---|---|
| Chairs | 200 | 100,000 | 200 | 80,000 | 180,000 |
| Laptop PCs | 300 | 60,000 | 300 | 18,000 | 78,000 |

In this example, the Russian high-technology (capital-intensive) industry is relatively less developed than the American—American workers are more than three times as efficient at producing laptop PCs than Russian workers, while the difference in efficiency in labor-intensive commodity goods (chairs) is much less pronounced.

After specialization, the world output of both computer laptops and chairs increases.

| Products | American workers | American output | Russian workers | Russian output | World output |
|---|---|---|---|---|---|
| Chairs | 0 | 0 | 500 | 200,000 | 200,000 |
| Laptop PCs | 500 | 100,000 | 0 | 0 | 100,000 |

However, it is assumed that the value of a PC is $1000, while the value of a chair is $100. In this way, we use the dollar price of a commodity as a proxy for its technological sophistication.

Before specialization, the output is as follows:

| Products | American workers | American output | Russian workers | Russian output |
|---|---|---|---|---|
| Chairs | 200 | $10,000,000 | 200 | $8,000,000 |
| Laptop PCs | 300 | $60,000,000 | 300 | $18,000,000 |
| Total | 500 | $70,000,000 | 500 | $26,000,000 |

Now, the world output after specialization under the assumption of a $1000 laptop and a $100 chair:

| Products | American workers | American output | Russian workers | Russian output |
|---|---|---|---|---|
| Chairs | 0 | $0 | 500 | $20,000,000 |
| Laptop PCs | 500 | $100,000,000 | 0 | $0 |
| Total | 500 | $100,000,000 | 500 | $20,000,000 |

While the world output increases both in production and in dollars, the American output increases disproportionately, from $70 million to $100 million per year due to specialization in high-technology products, while the Russian dollar output *decreases* from $26 million to $20 million due to the loss of the high-technology industry.

***Can Russian PC industry remain competitive if workers accept lower compensation?***

One may notice that free trade between Russia and the US *without specialization* will remain in equilibrium if the compensation of Russian computer makers is $60,000 per year, the compensation of Russian chair manufacturers is $40,000, and for their American counterparts, the compensation is $200,000 and $50,000, respectively. The Russian high-tech industry will lose its competitiveness and diminish only if Russian computer makers require compensation exceeding $60,000 per year.

Accepting compensation of $60,000 or less may not be possible for the Russian computer makers due to the relative training and skill required in the industry in their country. Consider a situation in which a person faces a choice. With minimal education and training, one can start making chairs and earn an annual income of $40,000 as early as possible in one's career. Alternatively, one can pursue further education and training to work in high technology. The only economic incentive to pursue the latter option is if the income later in the career more than compensates for the multiple years of college, graduate school, and all other required training. This is precisely what makes our world different from the classical "wine-and-cheese world," where one can show that both countries benefit from specialization (Krugman, Obstfeld, & Melitz, 2018).

***Job losses and job gains***

The dogma of free trade in which jobs lost in one industry are replaced by jobs gained in another industry is very true under this model. The more developed country loses jobs in low-skilled sectors but gains jobs in the high-value-added sector. The less developed country also compensates for the jobs lost in one sector with jobs gained in another sector. The only difference is that high-skilled jobs are replaced with low-skilled jobs, with the corresponding loss of technology and income. The long-run effect of free trade is to reallocate workers away from

domestic-only industries to export industries, while this reallocation leads to a more efficient *global* utilization of resources, the reallocation of resources in the country on the receiving end of the free-trade punch is the opposite.

**Discussion**

This study aims to provide the simplest possible two-country, two-commodity model with the smallest possible set of assumptions to demonstrate that free trade does not universally benefit all participating countries. Rather, free trade works *against* developing nations that are not able or lack the economic expertise to protect their most valuable industries.

However, when does free trade benefit all parties? One can easily observe in our example that both parties are better off if the value of a chair is between $150 and $400. Carbaugh (2018) described this as a situation of mutually beneficial trade or acceptable terms of trade. However, what does this mean? If we were comparing laptop PCs with 300-dollar tablets, in place of simple 100-dollar chairs, specializing in equally advanced technologies would benefit both participants. This example corresponds to trade between equally advanced economies, where one high-technology product is swapped for another. However, for a developing country that is giving up its most advanced product for specialization in manual labor, there are no mutually beneficial terms of trade. Importantly, there is no mechanism in the free market that would enforce the terms of trade acceptable for a developing country that can offer only primitive products for export.

The example shown in this paper can be used to illustrate or outline proof of the Vanek-Reinert effect (Reinert, 2005). With the establishment of a free trade regime between a developing and a developed nation, the most advanced industries in the developing nation cease to exist, leading to a loss of national income and a widened gap with the developed world.

Returning to our proverbial railroads, if a developing country gives up steam engine manufacturing to trade bananas for high-speed trains, the result may be quite spectacular. The few high-speed trains purchased with income from selling extra bananas may only be sufficient to haul these bananas for export, while the main mode of transportation in that country instead of steam-engine trains will become donkey carts.

Therefore, for a developing nation to improve its trade and economic wellbeing, it is important to first understand the potential disadvantages of free trade. Reinert (2019) emphasizes a very important idea: industries that are inefficient by global standards are not necessarily detrimental to the economy and welfare of developing countries. The findings of this study reinforce this view. From the perspective of the developing world, a successful economic policy necessarily needs to incorporate a very careful balance between specializing in sectors with comparative advantage and supporting and eventually improving competitiveness of old industries facing potential new challenges because of trade liberalization.

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