



New Exploration of Comparative Advantage Theoretical Model for International Trade in the Context of Global Carbon Emissions Reduction

^{a,b}Guo Qing, ^bJoaquín Ordieres

^aSchool of Economics and Management, China University of Geosciences, Wuhan, Hubei 430 074 China(qingguovip@gmail.com)

^bIndustrial Engineering Department, Technical University of Madrid, Madrid 28006 Spain



INDUSTRIALES
ETSII | UPM
UNIVERSIDAD POLITÉCNICA DE MADRID
ESCUELA TÉCNICA SUPERIOR DE
INGENIEROS INDUSTRIALES
DEPARTAMENTO DE INGENIERÍA DE ORGANIZACIÓN
ADMINISTRACIÓN DE EMPRESAS Y ESTADÍSTICA

中國地質大學
China University of Geosciences

Abstract

With the increasing world's greenhouse gas (GHG) emissions and pressing global warming, the Earth's ecological environment for human beings survival is ever more threatened by the carbon dioxide (CO₂), which is caused by the production and livelihood of the human beings themselves. Therefore, it is essential for the whole world to take strong measures for carbon emissions reduction. Under such circumstances, the traditional comparative advantage theory of international trade is bound to be challenged. Based on the classic comparative advantages of international trade and H-O theoretical model, this paper constructs a new Ricardian model and H-O theoretical model in combination of the carbon factor, using methodologies of theoretical deduction and comparative analyses. The results indicate: (1) considering the carbon factor, the original comparative advantage of international trade will disappear, and the original direction of trade flow changes. What is more, the country that has a comparative advantage in the production of certain products turns into the country that has the disadvantage; (2) in the case of remaining the same nature of factors, when taking the carbon factor into account, the original comparative advantage of international trade will be reversed. Based on the results of these analyses, this paper proposes relevant suggestions.

Key words : carbon factor; theory of comparative advantage; H-O theory; international trade

The value/impact of the research:

(1) Academic Impact

It is the first to establish a theoretical model of international comparative trade advantages under the background of global carbon emissions, enriching the theory of comparative advantage, it is another major leap forward in the history of the theory of comparative advantage.

(2) Reality Significance

The new theoretical model of international trade comparative advantages were analyzed and built. It revealed a new change of comparative advantage of different countries' export products under background of the global climate change and carbon emissions; it lead and nurture developing country production and export the low-carbon products; Thus achieving global carbon emissions and protecting the environment. So, the text has an important practical significance.

Table 1 The international division and exchange of cloth and wine considering labor cost

Countries		Cloth output (Unit)	Labor (People/Year)	Wine output (Unit)	Labor cost (People/Year)
Before division work	British	1	100	1	120
	Portugal	1	90	1	80
	Total	2	190	2	200
After division work	British	2.2	220	0	0
	Portugal	0	0	2.125	170
	Total	2.2	220	2.125	170
International exchange	British	1.2		1	
	Portugal	1		1.125	

Source: According to theoretical models deduction

Table 2 The international division and exchange of British wine and Portugal cloth considering the cost of carbon factor

Countries		Cloth output (Unit)	Cost of carbon factor (Yuan/Year)	Wine output (Unit)	Cost of carbon factor (Yuan/Year)
Before division work	British	1	90	1	80
	Portugal	1	100	1	120
	Total	2	190	2	200
After division work	British	0	0	2.125	170
	Portugal	2.2	220	0	0
	Total	2.2	220	2.125	170
International exchange	British	1		1.125	
	Portugal	1.2		1	

Source: According to theoretical models deduction

Table 3 The international division and exchange of Japanese textile wine and Australia wheat considering production cost

Countries		Textiles (Unit)	Cost	wheat (Unit)	Cost
Before division work	Japanese	1	13 (Yuan)	1	11 (Yuan)
	Australia	1	24 (Yuan)	1	28 (Yuan)
	Total	2	/	2	/
After division work	Japanese	0	0	2.18	24 (Yuan)
	Australia	2.17	52 (Yuan)	0	0
	Total	2.17	52 (Yuan)	2.18	24 (Yuan)
International exchange	Japanese	1		1.18	
	Australia	1.17		1	

Source: According to theoretical models deduction

Table 4 The international division and exchange of textiles and wheat considering the cost of carbon factor

Countries		Textiles (Unit)	Cost	wheat (Unit)	Cost
Before division work	Japanese	1	14 (Yuan)	1	14.5 (Yuan)
	Australia	1	22 (Yuan)	1	21 (Yuan)
	total	2	/	2	/
After division work	Japanese	2.04	28.5 (Yuan)	0	0
	Australia	0	0	2.05	43 (Yuan)
	total	2.04	28.5 (Yuan)	2.05	43 (Yuan)
International exchange	Japanese	1.04		1	
	Australia	1		1.05	

Source: According to theoretical models deduction