

The Nexus between Comparative Advantage and Liberal Agricultural Policies: Implications of China, India, USA, and the EU

Karşılaştırmalı Üstünlük ile Liberal Tarım Politikaları Arasındaki Bağlantı: Çin ve Hindistan, ABD ve Avrupa Birliği'nin Uygulamaları

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Abstract

This study analyzes the comparative advantages of China, India, the United States of America (USA) and the European Union (EU) in the world agricultural trade and investigates whether the protection policies implemented by the countries have an impact on comparative advantages. China and India have moved to the high ranks in the world agricultural trade in recent years. While these two countries, especially India, try to protect their agricultural sector through tariffs, the USA and the EU protect their agricultural sectors through domestic supports. The developing countries, led by China and India, have complained about the high protection rates applied by the developed countries, and this has always been a prominent subject in the World Trade Organization (WTO) rounds. In this study, the issue of whether protectionism affects comparative advantage has been tried to be analyzed with the econometric model. According to the findings, it was concluded that protectionist domestic policies did not affect the comparative advantage of the USA and the EU, but comparative advantage increased in China and India, where domestic protection rates are low and these countries pursue only tariffs in the agricultural trade.

Keywords: Revealed Comparative Advantage, Protectionism, Terms of Trade, Customs Tariffs, Domestic Support Payments

Öz

Bu çalışma Çin, Hindistan, Amerika Birleşik Devletleri (ABD) ve Avrupa Birliği'nin (AB) dünya tarım ticaretindeki karşılaştırmalı üstünlüklerini analiz edip, ülkelerin uyguladıkları tarım politikalarının üstünlükler üzerinde etkisi olup olmadığını araştırmaktadır. Çin ve Hindistan son yıllarda tarım ticaretinde dünyadaki sıralamaları yükselmiştir. Bu iki ülke özellikle Hindistan tarımı tarifeler yoluyla korumaya çalışırken, ABD ve AB tarım sektörlerini iç destekler yoluyla korumaktadır. Çin ve Hindistan önderliğindeki gelişmekte olan ülkelerin gelişmiş ülkelerin uyguladığı yüksek koruma oranlarından rahatsız olması hep Dünya Ticaret Örgütü (DTÖ) turlarında öne çıkan konu olmuştur. Korumacılığın, karşılaştırmalı üstünlüğe etkisi bu çalışmada ekonometrik model ile analiz edilmeye çalışılmıştır. Elde edilen bulgulara göre, korumacı politikaların ABD ve AB'nin karşılaştırmalı üstünlüğünün artmasına etki etmediği, iç destek oranlarının düşük olduğu, sadece tarifelerin uygulandığı Çin ve Hindistan'da da karşılaştırmalı üstünlüğün yükseldiği sonucuna varılmıştır.

Anahtar Kelimeler: Açıklanmış Karşılaştırmalı Üstünlük, Korumacılık, Dış Ticaret Hadleri, Gümrük Tarifeleri, İç Destek Ödemeleri

Araştırma Makalesi [Research Paper]

JEL Codes: F11, F13, F14

Submitted: 15 / 11 / 2021

Accepted: 13 / 04 / 2022

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Introduction

China and India are ever-growing developing countries in world trade. Their rising powers challenge the dominant roles of the European Union and the United States. India has been a World Trade Organization member since 1995 and China became a WTO member in 2001. Both countries integrated to the world trade after their WTO membership. They have advocated similar positions and presented similar proposals in the WTO agricultural negotiations. However, their position was generally challenged with the European Union's and the United States' trade views. China, India, the USA, and the EU are the biggest agricultural players and have comparative advantage in most of the agricultural products in the world trade but they are pursuing different protectionist agricultural policies. Developing countries proposed a fairer agricultural trade from which the developing countries could benefit; i.e. developing countries especially China and India proposed further concessions in the support levels from the EU and the USA.

This study aims to analyse the comparative advantage of China, India, the European Union, and the United States in the world agricultural trade and to determine the impact of the trade policies on comparative advantage. The importance of liberal agricultural trade policies is emphasized through the comparative advantage analysis of the world's leading countries in the agricultural trade. This study will add value to the literature by pointing out the relationship between the comparative advantage and the protectionist trade policies. The relevant literature research shows that the former studies have not discussed the comparative advantage in this perspective. This study has six parts. The second part summarises the studies that are taken as reference materials in this article. The third part gives information about the problem that arose from the different implications and positions of China, India, the USA and the EU in the agricultural trade policies. Their conflicts in the agricultural negotiations are mentioned. The fourth section also gives data that confirms the different agricultural policies pursued by the countries. The fifth section comprises the methodology and the data. Sixth chapter discusses the results and findings. Finally, the last chapter concludes the study.

1. Literature Review

The literature in this study comprises of the studies that use Revealed Comparative Advantage (RCA). Relative Comparative Advantage is based on the Theory of Comparative Advantage developed by David Ricardo (1817) which explains the relative advantage or disadvantage of a country in the trade of a product or services group. RCA was firstly mentioned by Liesner (1958). Later index for revealed comparative advantage was developed by Balassa (1964). The level of RCA in agricultural products and the variables affecting the comparative advantage are crucial materials for this study. In the literature, studies about RCA are summarised as follows:

Wosiek and Visvisi (2021) proposed an index called Visvisi–Wosiek RCA (VWRCA) index based on the RCA index in their article. The authors applied the index on the services sector in Poland for the period 2010–2019. The fall in the VWRCA index showed that comparative advantage deteriorated in the category of goods-related services, manufacturing services. The index raised in construction services shows that the relative advantage increases. Widodo (2019) examined the dynamic changes in the comparative advantage of the ASEAN, China, Republic of Korea and Japan (ASEAN+3). The comparative advantage pattern of the ASEAN becomes similar to that of Japan. China and Korea may have a comparative advantage in low technological groups of products. Hassan and Ahmad (2018) investigated the comparative advantage of Pakistan's exports throughout 1995 to 2013. The authors found a negative and significant relationship between RCA and exports. Foreign direct investment (FDI) has an insignificant and negative effect on RCA, however, human capital has positive and significant relationship with RCA. Bojnec and Ferto (2018) investigated the duration of comparative advantage indices in the European Union (EU-27) agri-food exports using the normalised revealed comparative advantage index on the global market. According to their findings, while large trade costs have a negative impact on the comparative advantage, gross domestic product and population have positive impacts. Bilas and Bošnjak (2015) analysed the relationship between the level of merchandise exports and revealed comparative advantage (RCA) indicators of Croatian exports on the European Union (EU) market for the period 1995-2012. The authors found a positive and significant relationship between RCA in the export of raw materials, machinery and transport vehicles (excluding fuel) and level of merchandise export.

Yalçınkaya et al. (2014) analysed the place of the Chinese economy in world trade and its effects on Turkish economy by using the RCA index. According to the findings, 5 industries with $RCAB > 0.5$ were identified: metal- mining, manufacture of food products and beverages, water supply- waste management, waste collection, and materials recovery. French (2014) analysed the appropriateness of the comparative advantage index on some countries and products and concluded that commonly used indexes are generally inconsistent with the theoretical issues of comparative advantage.

Erkan (2012) investigated the comparative advantage of Turkey and Syria between the years 2000-2008. According to the results, Turkey has a comparative disadvantage in 6 product groups, but comparative advantage in 45 goods. Serin and

Civan (2008) investigated Turkey's comparative advantage in the tomato, olive oil, and fruit juice industries in the EU market over the period 1995-2005. Turkey has a high comparative advantage in the fruit juice and olive oil markets in the European Union market, but has a disadvantage in the tomato market. Çakmak (2005) analysed the comparative advantage and competitiveness of Turkish textile apparel (SITC 84). The author revealed that the SITC 84 (Apparel and Clothing Accessories) commodity group is more competitive than SITC 65 (Textiles Yarn, Fabrics, Made-up Articles and Related Products) in the world markets. Batra and Khan (2005) examined the structure of comparative advantage of India and China in all sectors (SITC Rev.3) over the period 2000-2003. The authors revealed that agriculture was one of the sectors where only India is predominantly advantaged.

Different from the studies above, this study considers the impact of protection levels (domestic protection) and terms of trade on the comparative advantage. Impact of export levels are also analysed like the studies in the literature review.

2. Conflict in the Agricultural Trade between China-India and the European Union-the United States

Agricultural policies were firstly discussed in the GATT Uruguay Round (1988-1994) among the member countries. The Uruguay Round was an important step in the liberalization of world agricultural trade, and until then progress has been made in reducing the barriers. Six years after the end of the Uruguay Round, the WTO members met in Doha in 2001 with the aim of reducing the trade barriers furthermore. Because of their impressive growth in the years leading up to the Doha Round, India and China were able to play more influential roles compared to the other developing countries in the negotiations (Peterson, 2009: 85). The United States and the EU were leading the developed countries, while China and India were representing the developing nations during the negotiations. China and India claimed that the gains from trade liberalization (from the removal of trade barriers) are generally shared by industrialized countries, and they have begun to insist on a fairer sharing system in the negotiations. The issue that ended the Doha negotiations in 2008 concerned the rules that would allow countries to raise the tariffs if they experience a sudden rise of agricultural imports (Peterson, 2009: 87). India wanted to implement safeguards while the United States wanted a threshold for invoking the safeguards set much higher. China backed India on this proposal and the United States was unwilling to compromise stating that it had already made concessions in the negotiations (The Economist, 2008). European Union and the United States have been criticised for not taking sufficient steps to resolve the agricultural problems which are one of the major obstacles to complete the Doha Round (Grant, 2006:6). According to Schmitz and Messner (2008), China and India are the only actors worldwide that have the potential to challenge western dominance in global affairs considering their development. The authors suggested that both China and India can provide leadership for other developing countries through organisations.

14 years after the start of the Doha Round, WTO members decided to end the negotiations in 2015. Neither developed economies like the United States and the European Union nor developing countries like China and India took steps to make fundamental concessions (Jaso, 2016). After the failure of the Doha Round, the countries began to sign bilateral and regional trade agreement rather than multilateral agreements. This means that the conflict about the free trade in agricultural products between two sides ended also multinational trade agreements and common policies in the world agricultural trade.

3. The Nexus between Comparative Advantage and Liberal Policies of the Countries

Comparative advantage theory advocates liberal trade policies. The theory describes the gains from trade of the countries in the free market conditions. One of the assumptions of the law of comparative advantage is free trade which is opposite of the Mercantilists' view of protectionist trade policies. Comparative advantage theory and other classical trade theories can be best understood if they are regarded as reactions to the Mercantilists' views on trade and on the role of government (Salvatore, 1998: 27). Mercantilists advocated strict government control of all economic activity by stimulating nations' exports, but discouraging and restricting imports (Salvatore, 1998: 26). In this sense, protection levels are analysed to comment on whether protectionist policies have negative impact on the comparative advantage for the selected countries.

Table 1 and Figure 1 give information about the protection levels of the countries. Table 2 shows the import tariffs in the agricultural products that indicate protection in market access. Figure 2 demonstrates the protection in domestic support. According to the statistics, the import tariffs are relatively high in India, but domestic support is very low. India supports the agricultural sector by high tariffs. Domestic support level (proportion of support with output and payment limits) is very low in India. This means India protects its agricultural sectors only by tariffs. China also has a low domestic support level. The high tariffs are imposed for cereals, beverages and tobacco. The protection is very limited in China.

The import tariffs are high in dairy products in the EU and in the USA. The tariffs in other products are not relatively high compared to China and India. Both the EU and the USA protect their agricultural sectors mainly through domestic supports.

Table 1. Tariffs in Agricultural Products, 2019

	United States	European Union	China	India
Animal products	2,4	15,3	14,9	104,5
Dairy products	17,6	37,2	12,2	63,8
Fruit, vegetables, plants	4,8	11,5	14,8	101,2
Coffee, tea	3,2	5,9	14,9	133,1
Cereals & preparations	3,5	16,0	23,7	114,1
Oilseeds, fats & oils	4,3	5,3	11,1	165,1
Sugars and confectionery	13,3	24,3	27,4	126,2
Beverages & tobacco	15,0	18,9	23,2	120,4
Cotton	3,7	0,0	22,0	110,0
Other agricultural products	1,2	4,1	12,1	105,6

Source: WTO, 2021a.

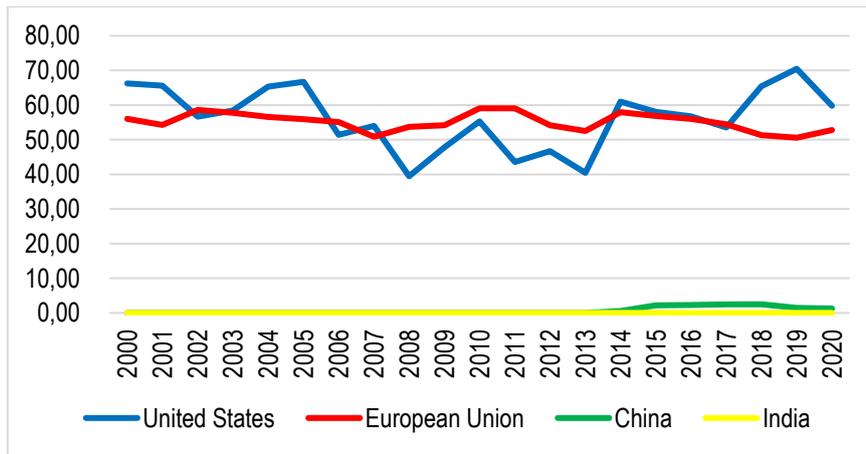


Figure 1. Proportion of Support with Output and Payment Limits

Source: OECD, 2021.

Revealed comparative advantage is crucial to determine whether there is a nexus between the agricultural policies pursued by the countries and comparative advantage. Firstly, Revealed comparative advantage is calculated by using the formula developed by Balassa.

(1)

$$RCA_{iA} = \frac{\frac{X_{iA}}{\sum_{i=1}^n X_{iA}}}{\frac{X_{iW}}{\sum_{i=1}^n X_{iW}}}$$

X_{iA} is the country A's exports of product i ,

$\sum_{i=1}^n X_{iA}$ is the country A's total export

X_{iW} is the world's exports of product i ,

$\sum_{i=1}^n X_{iW}$ is the world's total export

According to the index measurement, if the result is greater than 1, it is understood that the country has a comparative advantage, and if it is small, it has a comparative disadvantage.

Revealed comparative advantage indexes of the selected countries in the agricultural products are demonstrated in the Figure 2. Both China and India have increasing RCA trends. Especially China has the highest comparative advantage among the leading exporting countries. India also has a high comparative advantage. It is worth to say, India has the highest import tariffs among the selected countries. Both countries do not pursue protectionist domestic support policies. As seen in the graph, high domestic supports do not lead to the comparative advantage in the USA and in the EU. However, low domestic support leads to high comparative advantage in India and China. Both countries protect their agricultural sector through tariffs. Tariffs give a price advantage to domestic goods over similar goods which are imported (WTO,

2021b). The trade restriction effect of an import tariff may be uncertain; thus, an import tariff may not limit the imports. One reason is the domestic demand of goods from other countries. As long as there is demand in the country, the access of imported goods into the country will continue. Another reason is that the domestic demand and supply elasticities of the imported goods are generally unknown. If the exporter abroad undertakes a part of the tariff by lowering the price, the tariffs will not be restrictive on imports. So, protection of the agricultural sector rather than domestic support is reasonable. The WTO also advocates the application of tariffs rather than non-tariff barriers.

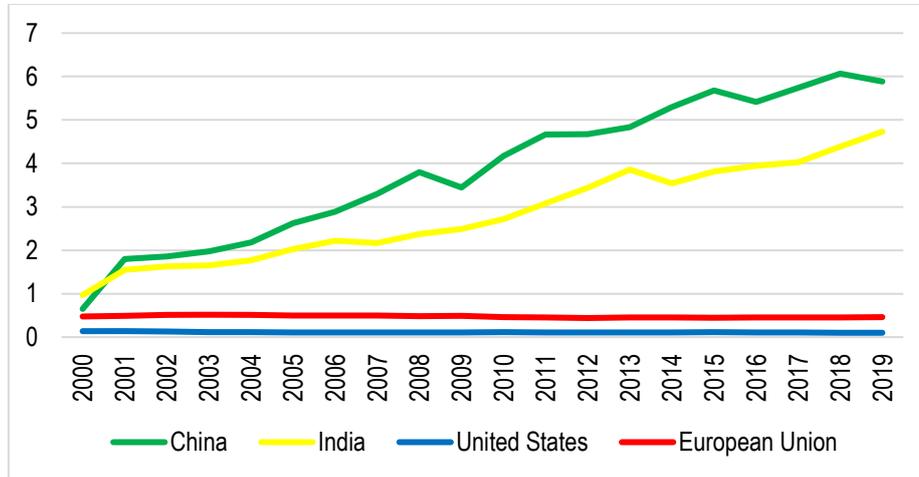


Figure 2. Revealed Comparative Advantage of the Countries

Source: Calculations of Author

4. Methodology

For estimating the comparative advantage of the countries by using Vector Autoregressive Model (VAR); export value (mn dollar), terms of trade, exchange rates and protection levels are used. The tariff rates are not used in the model because once the tariff rates are determined by the countries, they last for a long time.

The data on exports, export price index, import price index, import tariffs are taken from the WTO Data Portal (WTO, 2021c). Terms of trade (ToT) is the ratio between the export price index and the import price index. If the export prices increase more than the import prices, a country has a positive terms of trade (OECD, 2021b).

The 3-digit Standard International Trade Classification (SITC Revision 3) of the category “agricultural products” is used. The exchange rates (domestic currency per dollar for China, India, and the European Union; real effective exchange rates are used for the United States) of the countries are exported from the World Bank. Producer Nominal Protection Coefficients for the countries are published by the Organisation for Economic Co-operation and Development (OECD, 2021a). The data are time series representing 20 years from 2000 to 2019.

For the econometric analysis of revealed comparative advantage; stationary test, namely Augmented Dickey-Fuller (ADF) unit root test (Dickey and Fuller, 1979 and Phillips Perron, 1989) is used. Following the stationarity test, the econometric model below is estimated for all countries separately.

$$\ln ca_i = \beta_1 + \beta_2 \ln ex_i + \beta_3 \ln exr_i + \beta_4 tot_i + \beta_5 prot_i + \varepsilon_i \quad (2)$$

Here $\ln ca_i$ denotes the dependent variable, namely RCA index. The dependent variables are ex (export), exr (exchange rates), tot (terms of trade), $prot$ (Producer Nominal Protection Coefficient). The study discovers the impacts of independent variables on the revealed comparative advantage of the countries.

5. Findings and Results

Table 2 gives information about the selection of the optimal lag length for the model. According to the AIC, SIC and HQC criteria, optimal lag length is 2.

Table 2. Lag length criteria

	Lag length	AIC	SIC	HQC
China	0	-13.79	-13.543	-13.756
	1	-18.152	-16.668	-17.948
	2	-20.691*	-17.971*	-20.316*
India	0	-10.906	-10.659	-10.872
	1	-9.935	-8.447	-9.585
	2	-18.415*	-15.694*	-18.040*
EU	0	-8.265	-8.018	-8.231
	1	-15.352	-13.868	-15.147
	2	-17.098*	-14.377*	-16.723*
USA	0	-9.781	-9.533	-9.747
	1	-15.394	-13.91	-15.189
	2	-17.164*	-14.443*	-16.789*

Table 34 shows the unit root tests. Series are not stationary in their level values, but series become stationary when the first differences of variables are taken.

Table 3. Unit Root Tests

Variables	ADF		PP		Order of integration	
	Level	First difference	Level	First difference		
China	LNCA	-0.692	-8.664	-1.167	-9.708	I(1)
	LNEX	4.782	-2.257	4.782	-2.301	I(1)
	TOT	-0.878	-5.004	-0.872	-5.004	I(1)
	LNEXR	0.491	-5.842	0.523	-5.858	I(1)
	PROT	0.86	-5.765	1.116	-6.187	I(1)
India	LNCA	-0.505	-8.885	-0.998	-13.358	I(1)
	LNEX	1.891	-1.292	1.916	-1.286	I(1)
	TOT	0.134	-5.021	0.184	-6.764	I(1)
	LNEXR	3.46	-3.497	2.891	-3.473	I(1)
	PROT	-0.648	-4.475	-0.682	-4.488	I(1)
EU	LNCA	-0.578	-4.256	-0.577	-4.253	I(1)
	LNEX	2.663	-2.758	2.578	-2.807	I(1)
	TOT	0.136	-4.716	0.236	-5.091	I(1)
	LNEXR	-0.65	-3.621	-0.65	-3.591	I(1)
	PROT	-1.151	-3.717	-1.829	-3.778	I(1)
USA	LNCA	-4.817	-9.015	-4.828	-28.007	I(0)
	LNEX	2.011	-4.132	1.969	-4.157	I(1)
	TOT	0.706	-6.728	0.825	-6.238	I(1)
	LNEXR	0.47	-3.881	0.381	-3.913	I(1)
	PROT	-1.331	-4.328	-1.429	-4.336	I(1)

According to the tests, 1 delay length is preferred in this study. Table 4 shows the statistics of the estimated models for the countries. P-values of the coefficients are shown in parentheses.

Table 4. Estimates of Revealed Comparative Advantage Model

Independent Variables	China	India	EU	USA
dex	0.42	0.29	-0.01	-0.14
[prob.]	[0.0475]	[0.0086]	[0.5945]	[0.0377]
dtot	-0.02	-0.002	-0.009	3.2
[prob.]	[0.1096]	[0.6968]	[0.0040]	[0.9968]
dexrate	1.88	0.81	-0.12	-0.56
[prob.]	[0.0692]	[0.0500]	[0.0140]	[0.1634]
dprot	2.57	-1.41	0.02	-9.95
[prob.]	[0.1182]	[0.1668]	[0.8690]	[0.0479]
Constant	-13.98	-7.59	1.69	7.27

[prob.]	[0.0275]	[0.0003]	[0.1011]	[0.0157]
R-squared	0.7	0.94	0.68	0.71
Prob (F-stat)	0.0007	0.0000	0.0009	0.0009
Number of observations	20	20	20	20

The estimated models below provide information about the efficacy of the variables on the comparative advantage of the countries:

$$\text{China} \quad \text{Inca} = -13.98 + 0.42\text{Inex} + 1.88\text{Inexr} + (-0.02)\text{tot} + 2.57\text{prot} + \varepsilon \quad (3)$$

$$\text{India} \quad \text{Inca} = -7.59 + 0.29\text{Inex} + 0.81\text{Inexr} + (-0.002)\text{tot} + (-1.41)\text{prot} + \varepsilon \quad (4)$$

$$\text{EU} \quad \text{Inca} = 1.69 + (-0.01)\text{Inex} + (-0.12)\text{Inexr} + (-0.009)\text{tot} + 0.02\text{prot} + \varepsilon \quad (5)$$

$$\text{USA} \quad \text{Inca} = 7.27 + (-0.14)\text{Inex} + (-0.56)\text{Inexr} + 3.2\text{tot} + (-9.95)\text{prot} + \varepsilon \quad (6)$$

Export level (dex) is significant in the models of China, India and the United States. There is a positive relationship between the export level and the comparative advantage in the econometric models. The rise in export level causes an increase of 0.42% and 0.29% in RCA values in China and India, respectively. Export (Inex) is also significant in the model of the USA, but does not have an impact on the RCA. Exchange rate (Inexr) seems to have impact only on India's comparative advantage. Terms of trade (tot) is significant only in the model of the EU, but the variable has a negative impact on the RCA.

Protection level (prot) is only significant in the model of the USA, however there is a negative relationship between the protection and the RCA. The argument that domestic protection does not affect the comparative advantage is consistent with the negative relationship between the protection level and the comparative advantage in the econometric models (part 3).

It must be mentioned that, the theory does not consider transport costs, productivity of labor and technology. When the transport costs, labor productivity and technology are taken into account, then the comparative advantages can change.

Conclusion

In this study, it is discussed whether the policies implemented by China and India, as well as the USA and the European Union in agricultural trade create comparative advantage. With the integration of China and India into world trade in recent years, they have moved to the high ranks in the world trade order. The USA and the EU, which play leading roles in the world agricultural trade, are criticized by the developing countries because of their protectionist support policies. While China and India do not apply domestic support policies, they protect their agricultural sectors with market access measures like import tariffs. In particular, India applies high tariffs for agricultural products. It is thought that developing countries can only take part in the world trade through market access measures as opposed to the developed countries that have enough capital, so can provide high support to producers.

According to the comparative advantage analysis made in this study; it has been observed that China and India are comparatively advantageous over USA and the EU in the agricultural products. Domestic supports applied by the USA and the EU have no effect on the comparative advantage. However, protection through market access barriers leads to comparative advantage. It is worth to say, the impact of tariff as a protection tool is unclear. The tariff raises the prices of the goods. The consumers may bear these high prices, so the goods may be imported in the case of high tariffs.

Further studies can analyze the factors affecting the comparative advantage in different sectors by also considering the policies implemented by developed countries and developing countries.

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