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Latin America's Export Trade Prospect of Agricultural Products to China

Jun Zhang¹ , Valeska V. Geldres-Weiss² , and Jorge Heredia³ 

ABSTRACT

The objective of this research is to analyze the trade prospect of Latin America countries' exporting agricultural products to China combining the dimensions of competitiveness and trade potential, and using the Boston Matrix. Based on the agricultural product trade data from 2000 to 2019, three categories are analyzed based on Harmonized System: animal, plant, and food processing product. The results show there are 4 LA countries in the zone of bright prospect trading agricultural products with China, which are Mexico, Brazil, Uruguay and Argentina. And 16 countries in the zone of promising prospect, 6 countries in the zone of bottleneck prospect, 5 countries in the zone of dark prospect. From the perspective of the category of agricultural products, plant agricultural product is the category in which there are the most countries with bright prospect. From the perspective of trading region, South America is the area in which countries with bright prospect concentrate. Countries with dark prospect mainly concentrate in Central America and South America. Countries with bottleneck prospect evenly distribute in different regions. Countries with promising prospect mainly concentrate in the West Indies. To promote Sino-LA agricultural trade, trade categories should be expanded and trade potential should be improved. Plans could be made for cooperation according to local conditions. LA should improve the quality control of exported agricultural products. China and LA should promote regional integration and strengthen technology cooperation in agricultural industry.

KEY WORDS:

Latin America, China, agricultural trade, competitiveness, trade potential, trade prospects, Boston Matrix.

JEL Classification: Q170, O130.

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1. Introduction

With a per capita arable land area of 0.242 hectares (World Bank, 2022), Latin America (LA) is known as "the Granary of the World in the 21st Century". After the "1+3+6" Cooperation Framework between Latin America and China and the establishment of China-CELAC Forum, Sino-Latin America relationship has upgraded from trading and investing to developing, and developed from a community of shared interest and responsibility into a community with shared future. In 2019, to-

tal import and export of agricultural products between China and Latin America reached 49.75 billion, accounting for 21.78% of China's total import and export of agricultural products (Ministry of Agricultural and Rural Affairs of People's Republic of China, 2022). Brazil has become China's largest trading partner in agricultural products since 2018, taking the place of the United States. Latin America is an extension of the 21st Century Maritime Silk Road. Under the background of China's expanding imports of agricultural products, the promotion of the Belt and Road Initiative, and Sino-US economic

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and trade frictions, research on promoting Latin American agricultural products exports to China can not only meet China's need of diversified imports of high-quality agricultural products, but also boost the economic development of Latin America.

The objective of this research is to analyze the trade prospect based on the competitiveness and trade potential between LA and China of three categories of agricultural products, based on Harmonized System, these are: animal agricultural products (HS01-HS05), plant agricultural products (HS06-HS14) and food processing agricultural products (HS15-HS24) (see Annex 1). The analysis involves 33 countries of Latin America classified in four regions: North America, Central America, South America and West Indies (see Annex 2).

2. Literature Review

Bilateral trade relationship between China and Latin America is close. With an average annual growth rate of 18.52%, the amount of Sino-Latin American agricultural products trade has risen from 1.77 billion dollars in 2000 to 44.73 billion dollars in 2019, with a total increase of 24 times (United Nations, 2022). In bilateral agricultural trade, China has comparative advantage in silk, fruit, vegetable and rice, while Latin America has comparative advantage in poultry, beef, soybean, coffee, sugar and tobacco (Sun et al., 2011). From the perspective of products of specific countries, Chile has comparative advantage in aquatic product, fruit and related products, while China in vegetable, tea and grain (Li et al., 2007). Major grain and oilseed producing countries such as Brazil and Argentina are export-oriented in China's market, while China competes fiercely with countries as Chile and Peru in fruit and vegetable in the world market (Calallero et al., 2011). There is huge difference between China and Latin America in agricultural resources and climates, so they have strong complementarity in agricultural product trade (Han & Liu, 2018; Ma et al., 2012; Zhong et al., 2014). Demand, structure and competition are main reasons resulting in the small total sum of bilateral agricultural trade between China and Latin America (Liu, 2017; Zhuang et al., 2015). The price level and land area of LA countries are factors ben-

eficial to their agricultural product exporting to China (Song, 2013), also the sharing membership of the same trade organizations and liner transportation (Hu, 2018).

Based on the data analyses of agricultural exports from Latin America, the feasibility of Latin America replacing the US in exporting agricultural products to China is limited in soybean and sorghum, but the level of substitution is high in food, aquatic product, vegetable and fruit, pork (Song & Hu, 2019). Under the Sino-US trade friction, Latin American countries are expected to expand their exporting to China (Shi, 2019). The overall potential of China importing agricultural products from Latin America is strong (Cao et al., 2021). In general, China's bilateral agricultural trade with most Latin America countries is not enough, and there is still considerable trade potential for the two sides (Cai, 2013; Gen, 2015; Zhou & Zhou, 2020).

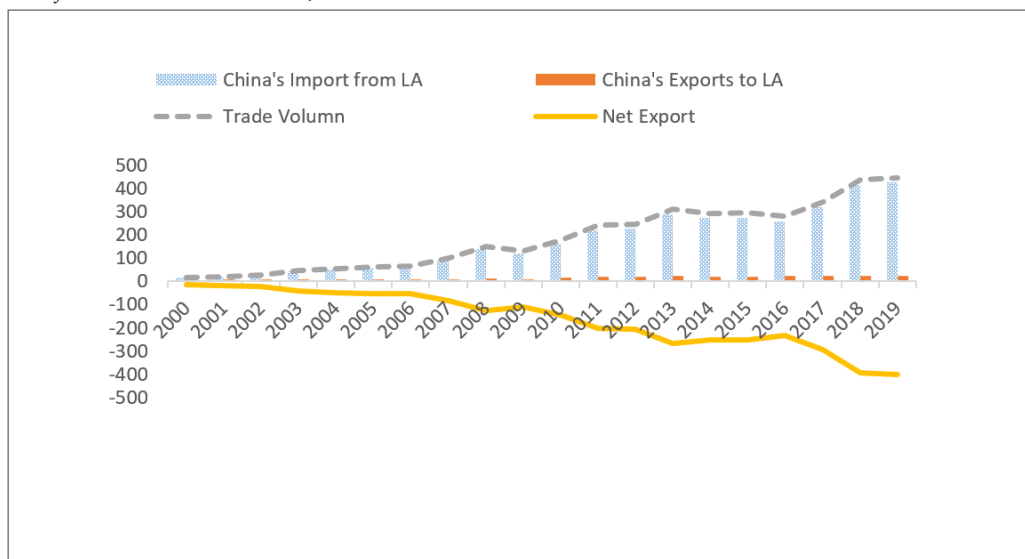
Existed literatures on agricultural products trade between China and Latin America focus on factors affecting trade using gravity model, and often focus on one specific country, lacking researches on the competition and complementary of trade of the whole region. In most papers, agricultural products are taken as a whole to be researched, but not research on different categories of products with different competition and complementary (Mizik, 2021).

3. The Status Quo of Latin America's Agricultural Products Exporting to China

In the agricultural products trade between China and Latin America, according to UN Comtrade Database (UN, 2022) more than 90% of the trade volume are China's imports from LA, which increases from 1.64 billion dollars in 2000 to 42.46 billion dollars in 2019 with the growing of 25 times and the average annual growth rate of 18.68%. China's net agricultural products export to LA has fallen from minus 1.51 billion dollars in 2000 to minus 40.19 million dollars, with China's deficit position for a long time and the deficit being expanding gradually. During the same period, China's import of agricultural products from LA has grown even faster with the average annual growth

Figure 1

Agricultural Products Trade between China and LA from 2000 to 2019 (100 Million Dollars) Calculated Based on the Data from UN Comtrade Database June 2022.



rate of 18.68%. LA has become an important importing source of China's agricultural products (see Figure 1).

In terms of the share of various agricultural products imports, China's imports from LA are mainly plant agricultural products, accounting for 50% to 80% of total imports. The share of animal agricultural products imports is gradually increasing, accounting for nearly 33% by 2019. Food processing agricultural products occupied a relatively high share at first, but it has shown a downward trend since 2010, and accounting for less than 10% by 2019. It shows the highly concentrated structure of China's agricultural imports from LA (see Annex 3).

In terms of the subdivision of agricultural product categories, from 2000 to 2019 China's imports of agricultural products from LA has concentrated at HS 02 (meat and edible meat offal), HS 12 (oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder), HS 15 (animal, vegetable or microbial fats and oils and their cleavage products; prepared edible fats; animal or vegetable wax), HS 17 (sugar and sugar confectionery), HS 23 (residues and waste from the food industries; prepared animal fodder). The total imports

of these five categories account for 90%. The imports of HS 12 account for more than 50% each year (see Annex 4).

In 2000, the top 5 categories of China's imports of agricultural products from LA are in HS 12, HS 23, HS 08, HS 17, and HS 03, accounting for 53.11%, 25.57%, 4.93%, 3.57% and 3.56% respectively and total accounting for 90%. Twenty years later, the top 5 categories of China's imports of agricultural products from LA changes as HS 12, HS 02, HS 03, HS 08, and HS 23, total accounting for 94% (see Annex 5). In it, the significant change is in HS 02, the share of which increases from 1.24% in 2000 to 20.43% in 2019, and HS 23, the share of which decreases sharply from 25.57% in 2000 to 3.19% in 2019.

Brazil, Peru, Chile, Argentina and Uruguay are the top five countries from which China imports agricultural products from LA, accounting for 90% of the total, even over 95% in years except 2000, 2001 and 2019 (see Annex 6). Brazil is the largest exporter of agricultural products to China in LA, its sharing in the LA marketing exporting increasing from 26.89% in 2000 to 61.39% in 2019, and even reaching 75.34% in 2018. Argentina is the second largest exporter of agricultural products, the share of China's import of

agricultural products from it fluctuating around 40% from 2000 to 2018. Since 2008, China's import from Argentina has decreased, resulting in a continuous decline of the import share, with the lowest proportion of 7.44%. China's import from Peru has also been declining, accounting for less than 10% in most years. Chile and Uruguay are the fourth and fifth largest exporters respectively. Their export share of less than 10% in total LA market remained relatively stable from 2000 to 2019. The previous analysis shows that the market structure of China's agricultural products import from LA is very concentrated in the above five countries. And Brazil plays an increasingly important role in China's agricultural products import.

China has been in deficit in agricultural trade with LA for many years, and the deficit is expanding over years. The distribution of agricultural products and markets between China and LA is highly concentrated. There are 33 countries in LA, and China trades with most of them, but about 90% of the trade comes from only a few countries, with a high concentration of trade countries. More than 80% of China's imports of agricultural products come from Brazil and Argentina. About 70% of China's agricultural exports go to Mexico, Brazil and Chile.

4. Methodology

In most research, trade prospect is measured only by trade potential by constructing gravity model (Khayat, 2019). While besides trade potential, the competitiveness in the exporting countries should also be considered when the trade prospect of the country in exporting agriculture products is analyzed. To evaluate the trade prospect of LA in exporting agricultural products to China in a more accurate and comprehensive way, the paper combines the two dimensions of competitiveness and trade potential.

Competitiveness is analyzed using the Revealed Comparative Advantage Index (RCA Index) by Balassa as (Balassa, 1965):

$$RCA_{mi} = (X_{mni} / X_{mn}) / (X_{mwi} / X_{mw})$$

m refers to the country in LA, n refers to China, w refers to the world and i refers to one category of agricultural products. X_{mni} and X_{mwi} refer to the

export volume of category i agricultural product from a country in LA to China and to the World respectively. X_{mn} and X_{mw} refer to the total export of agricultural products from a country in LA to China and to the World respectively. Generally, RCA higher than 1 indicates that LA countries have comparative advantages in exporting category i agricultural product to China. The greater the value, the more obvious the comparative advantage.

To calculate the Trade Potential of Latin America's exporting agricultural products to China, an Extended Gravity Model is constructed. Considering the trade reality and the research purposes, the model analyzes LA countries' exporting agricultural products to China shown as in equation (1).

$$\begin{aligned} \ln Y_{mn,t} = & \beta_0 + \beta_1 \ln GDP_{m,t} + \beta_2 \ln GDP_{n,t} \\ & + \beta_3 \ln Dis_{mn,t} + \beta_4 \ln NPL_{mn,t} \\ & + \beta_5 RTA_{mn,t} + \beta_6 \ln Land_{m,t} + \mu_{mn,t} \end{aligned} \quad (1)$$

In equation (1), β_0 is the constant. $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$. $\mu_{mn,t}$ is random disturbance.

$Y_{mn,t}$ refers to the export volume of agricultural products from Country m in LA to China (n). $GDP_{m,t}$ and $GDP_{n,t}$ refer to GDP of Country m in LA and GDP of China, $Dis_{mn,t}$ refers to the distance between China and the capital city of Country m in LA. $NPL_{mn,t}$ refers to price level in Country m in LA. $RTA_{mn,t}$ is dummy variable referring that China has regional trade agreement with Country m in LA. $Land_{m,t}$ refers to agricultural land per capital in Country m in LA (including cultivated land, garden land, raising and catching water surface and so on). Data of GDP of China and LA countries current US dollars), domestic price level, population and agricultural land area of LA countries are from World Bank. Distance between China and capitals of LA countries comes Huangjingyiyuan database and distance calculator on www.indo.com. Whether China and LA countries have signed regional trade agreements comes from China Free Trade Zone Service Website of the Ministry of Commerce of the People's Republic of China.

Trade potential is the theoretical trade volume of agricultural products exported from LA to China can be calculated through the model, which can be

considered as the volume that LA should export to China with all the conditions hold in the model. The ratio of P of the actual trade volume to the theoretical trade volume then can also be calculated, which is the trade potential of agricultural product exported by LA to China.

Trade Prospect of LA Exporting Agricultural Products to China could be decided according to Boston Matrix. It is a two dimensional cross-analysis method which is formed to evaluate the country's trade prospect, with product competitiveness as the horizontal axis and trade space as the vertical axis (Wang & Cheng, 2020). In this method, the competitiveness of agricultural products from LA countries is indicated by the revealed comparative advantage index (RCA). $RCA \geq 1$ indicates strong competitiveness, and $0 < RCA < 1$ indicates weak competitiveness. Trade Space (TS) is using 1.20 minus trade potential P. When $0 < TS \leq 1.2$, it means there is still trade space. When $TS \leq 0$, it means there is no trade space. According to the dividing point of competitiveness and trade space, two-dimensional space can be divided into four quadrants as promising prospect, bright prospect, bottleneck prospect and dark prospect (see Annex 7).

The first step is to calculate the RCA index by Balassa for different LA countries in exporting all agricultural products and also three different categories of agricultural products. Then get the theoretical trade volume from gravity model set of LA countries in exporting all agricultural products and also three different categories of agricultural products to China. Trade potential P is calculated by the ratio of actual trade volume over theoretical trade volume of LA countries in exporting all agricultural products and also three different categories of agricultural products to China. With the result, trade space is calculated by using 1.20 minus trade potential P. Combining the result of competitiveness and trade space of different LA countries in exporting all and different categories of agricultural products to China, their trade prospect could be located and analyzed. When LA countries have their $RCA \geq 1$ and $0 < TS \leq 1.2$ in exporting all and different categories of agricultural products to China, they have strong competition and trade space, so their trade prospect is defined as bright prospect. When

LA countries has their $0 < RCA < 1$ and $0 < TS \leq 1.2$ in exporting all and different categories of agricultural products to China, they have weak competition and trade space, so their trade prospect is defined as promising prospect. When LA countries has their $0 < RCA < 1$ and $TS \leq 0$ in exporting all and different categories of agricultural products to China, they have weak competition but no trade space, so their trade prospect is defined as dark prospect. When LA countries have their $RCA \geq 1$ and $TS \leq 0$ in exporting all and different categories of agricultural products to China, they have strong competition but no trade space, so their trade prospect is defined as bottleneck prospect.

Trade prospect is analyzed for 31 countries because of the unavailable data of Cuba and Venezuela. The agricultural products cover all the categories from Chapter 1 to Chapter 24 in HS Code, which are divided into three categories as animal agricultural product (HS01-HS05), plant agricultural product (HS06-HS14), and food processing product (HS15-HS24) (see Annex 1). The period is from 2000 to 2019. Data of agricultural products exported by LA to China come from UN Comtrade database of the UN Statistics Division. Trade prospect of LA exporting agricultural products to China is calculated and analyzed based on the data of 2019. The results are presented in the paper for the five years as 2000, 2005, 2010, 2015 and 2019.

5. Results

5.1. Competitiveness of LA exporting Agricultural Products to China

For animal agricultural products, less than half of LA countries have comparative advantage in exporting to China. Among them, Uruguay, Mexico, Costa Rica, Guyana, Suriname and Ecuador all have relatively stable comparative advantage in exporting. In the five years presented in the study, more than three years their RCAs were higher than 1, indicating that these six countries have strong and relatively stable comparative advantage in exporting to China's market. In addition, El Salvador, Dominica, Saint Vincent and the Grenadines, Bolivia, Antigua and Barbuda have RCA higher than 10, which means these countries value China's mar-

ket and their products have strong competition in China. In 2019, totally 15 countries have comparative advantages in exporting animal agricultural products, which are Panama, Cuba, Bahamas, Uruguay, Mexico, Costa Rica, Jamaica, Guyana, Suriname, Ecuador, Bolivia, Argentina, Belize, Antigua and Barbuda (see Annex 8).

For plant agricultural products, less than half of LA countries have comparative advantage in exporting to China's market. Honduras, Jamaica, Colombia, Brazil, Bolivia, Argentina and Paraguay have relatively stable comparative advantage in exporting, among which Jamaica, Brazil and Argentina are the most competitive countries from 2000 to 2019. In 2019, Barbados and Chile also have comparative advantage in exporting plant agricultural products besides the above seven countries (see Annex 9).

For food processing agricultural products, less than half of LA countries have comparative advantage in exporting to China's market. The overall competitive advantage of food processing agricultural products in LA countries is the most stable among the three categories of agricultural products, and the competitiveness of all countries is equal. Countries with comparative advantage in exporting and strong stability include Cuba, Dominica, Barbados, Guatemala, Nicaragua, Panama and Peru. Among them, only Peru's competitive advantage is increasing, while the competitiveness of the other six countries remains unchanged or even decreases year by year. In 2019, there were 10 countries with comparative advantages in exporting food processing agricultural products, including EL Salvador, Dominica, Barbados, Saint Lucia, Paraguay, Guatemala, Nicaragua, Panama, Haiti and Peru (see Annex 10).

In sum, LA countries have comparative advantages in exporting different categories of agricultural products. There are few countries that maintain stable comparative advantage in certain category of agricultural products in the 20 years, except Guyana in animal agricultural products, Brazil and Argentina in plant agricultural products, Guatemala, Panama and Peru in food processing agricultural products. The trend shows the total numbers of LA countries with comparative advantage in exporting

different categories of agricultural products has increased, from 18 countries in 2000 to 32 countries in 2019.

5.2. Trade Potential of LA exporting Agricultural Products to China

Extended Gravity Model as in Equation (1) is constructed to calculate LA countries' exporting agricultural products to China, which is the theoretical exporting volume that LA countries should export with all the conditions hold.

The descriptive statistics of all non-dummy variables shows, the total amount of agricultural products exported by LA countries to China varies a lot, also the standard deviation of the total amount of various agricultural products, the gap between the maximum and minimum value (see Table 1). Therefore, the research on agricultural product trade between LA and China should focus on each different country. There is also huge difference in GDP of LA countries, distance between China and LA countries, and agricultural land area per capita in LA countries (Balogh & Borges Aguiar, 2022). These are factors affecting the agricultural trade between China and LA countries

Before the multiple regression analysis, multicollinearity between variables is tested. Related coefficient matrix of variables shows, variables do not have strong correlation other than distance between China and LA countries and agricultural land per capita in LA (see Table 2). Further test is by VIF index and the result shows that the average VIF is 1.64, which indicates that there is no serious multicollinearity problem among independent variables.

The regression model is chosen after F test, LM test and Hausman test by Stata14. $P=0$ in F test indicates fixed effect model is better than mixed effect model. $P=0$ in LM test indicates random effect model is better than mixed effect model. According to $P=0.0652>0.05$ in Hausman test, original assumption should be accepted and random effect model is used for regression. Independent variables which have significant impact on dependent variable are selected by stepwise regression (see Table 3).

When independent variables are GDP of China

Table 1*Descriptive Statistics of Non-dummy Variable*

Variable	N	mean	Sd.	p50	min	Max
Ymn,t	620	5.558×104	2.667×105	33.709	0	3.126×106
Yamn,t	620	5.92×103	3.031×104	0.617	0	4.588×105
Ybm,n,t	620	3.986×104	2.227×105	0.252	0	2.732×106
Ycm,n,t	620	9.8×103	3.209×104	1.175	0	2.705×105
GDPm,t	620	1.284×103	3.534×103	1.424×102	3.332	2.616×104
GDPn,t	20	6.546×104	4.547×104	5.594×104	1.211×104	1.428×105
Dismn,t	31	14860.140	1945.942	14123.000	12491.41	19260.08
NPLmn,t	620	0.558	0.165	0.538	0.197	1.111
Landm,t	620	0.862	1.17	0.365	0.035	4.506

Note: Y is in 10 thousand US dollars. GDP is in 100 million US dollars.

Table 2*Related Coefficient Matrix of Variables*

	lnY	lnGDPm	lnGDPn	lnDis	lnNPL	RTA	lnLand
lnY	1						
lnGDPm	0.7816***	1					
lnGDPn	0.1673***	0.1800***	1				
lnDis	0.5020***	0.3948***	0	1			
lnNPL	-0.2328***	-0.1486***	0.3162***	-0.2077***	1		
RTA	0.2781***	0.2538***	0.1817***	0.2624***	0.1115***	1	
lnLand	0.6501***	0.5163***	-0.0534	0.6766***	-0.4801***	0.1052***	1

and various LA countries, distance between China and LA countries, price level in LA countries, the four independent variables have significant impact on dependent variable with $R^2=66.75\%$. Gravity model for LA exporting agricultural products to China is as in Equation (2).

$$\ln Y_{mn,t} = -203.875 + 2.274 \ln GDP_{m,t} + 0.715 \ln GDP_{n,t} + 14.507 \ln Dis_{mn,t} - 2.211 \ln NPL_{mn,t} + \mu_{mn,t} \quad (2)$$

Stepwise regression is done for LA exporting animal agricultural products, plant agricultural products, and food processing agricultural products to China. The results show LA exporting various agricultural products to China is affected by different factors.

Gravity model for LA exporting animal agricultural products to China is as in Equation (3):

$$\ln Ya_{mn,t} = -153.506 + 1.25 \ln GDP_{m,t} + 0.619 \ln GDP_{n,t} + 12.009 \ln Dis_{mn,t} + 1.422 \ln Land_{m,t} + \mu_{mn,t} \quad (3)$$

Gravity model for LA exporting plant agricultural products to China is as in Equation (4):

$$\ln Yb_{mn,t} = -248.579 + 2.241 \ln GDP_{m,t} + 21.26 \ln Dis_{mn,t} + \mu_{mn,t} \quad (4)$$

Gravity model for LA exporting food processing agricultural products to China is as in Equation (5):

$$\ln Yc_{mn,t} = -76.832 + 2.286 \ln GDP_{m,t} + 1.132 \ln GDP_{n,t} + 1.193 \ln Land_{m,t} + \mu_{mn,t} \quad (5)$$

The theoretical trade volume of all kinds of agricultural products exported from LA to China can be calculated through Equation (3)-(5), which can be considered as the volume with all the conditions

Table 3
Regression Result of Gravity Model for LA Exporting Agricultural Product to China from 2000 to 2019

Variable	Step1	Step2	Step3
	(1)	(2)	(3)
lnGDPm,t	2.274*** (8.15)	2.301*** (8.30)	1.994*** (7.20)
lnGDPn,t	0.715*** (3.32)	0.740*** (3.40)	0.895*** (4.03)
lnDismn,t	14.507*** (2.77)	14.756*** (2.85)	5.567 (0.97)
lnNPLmn,t	-2.211** (-2.37)	-2.137** (-2.29)	-1.519 (-1.60)
RTAmn,t		-0.821 (-0.92)	
lnLandm,t			1.489*** (2.66)
Constant	-203.875*** (-4.16)	-207.367*** (-4.27)	-114.856** (-2.08)
Observations	620	620	620
R ² _overall	66.75%	66.45%	70.02%
Wald chi2	204.47	207.70	237.54

hold. The ratio of P of the actual trade volume to the theoretical trade volume can also be calculated, which is the trade potential of agricultural product exported by LA to China (see Table 4).

Based on the trade data in 2019 and the classification of trade potential, it is rebuilt type of bilateral trade when $P \geq 1.20$. In this case, both trading parties should maintain the present positive factors, and keep exploring and cultivating new ways to promote their trade. When $0.80 < P < 1.20$, it is explored type of bilateral trade. At this time, it is possible for both sides to expand their trade. Meanwhile, they also need to stabilize and develop factors to promote trade. When $P \leq 0.80$, it is the type with huge potential. While trading with this type of countries often need to face numerous trade barriers or some tough practical obstacles, the first should be done is to solve the obstacles to development and provide conveniency and preferential policies for bilateral trade to make full use of the trade potential with these countries.

It shows LA has huge trade potential to export agricultural products to China. There are 11 coun-

tries belonging to rebuilt type of trade potential, 6 countries belong to explored type of trade potential, and 14 countries belonging to the type with huge potential. For the exporting of animal agricultural products, there are 16 countries belonging to rebuilt type of trade potential, 11 countries belong to explored type of trade potential, and 4 countries belonging to the type with huge potential. For the exporting of plant agricultural products, there are 9 countries belonging to rebuilt type of trade potential, 14 countries belong to explored type of trade potential, and 8 countries belonging to the type with huge potential. For the exporting of food processing agricultural products, there are 11 countries belonging to rebuilt type of trade potential, 8 countries belong to explored type of trade potential, and 12 countries belonging to the type with huge potential. Thus, in the three categories of agricultural products exported by LA plant agricultural product is the one with the highest trade potential, followed by food processing agricultural product and animal agricultural product.

There are huge different of the trade potential

Table 4*Trade Potential of LA Countries Exporting Agricultural Products to China in 2019*

Country	All Agricultural Products	Three Categories of Agricultural Products		
		Animal Agricultural Product	Plant Agricultural Product	Food Processing Agricultural Product
Mexico	1.03	1.48	1.33	0.90
Guatemala	1.26	1.07	1.73	1.34
Honduras	1.12	1.30	1.84	0.81
Salvador	1.46	0.00	1.97	1.66
Nicaragua	1.49	1.58	2.05	1.63
Costa Rica	1.29	1.88	1.59	1.23
Panama	1.15	1.53	1.32	1.23
Haiti	0.78	1.30	0.00	0.86
Dominica	1.04	0.99	0.90	1.17
Jamaica	1.35	2.15	2.16	1.26
Trinidad and Tobago	0.00	0.00	0.00	0.00
Barbados	1.01	0.00	0.81	1.54
Grenada	0.00	0.00	0.00	0.00
Dominica	0.00	0.00	0.00	0.00
saint Lucia	1.83	0.00	0.00	3.40
Saint Vincent and the Grenadines	0.00	0.00	0.00	0.00
Bahamas	1.39	3.58	0.00	1.18
Guyana	1.67	1.74	0.34	0.66
Suriname	1.50	2.61	0.00	1.93
Colombia	0.90	1.00	1.14	0.87
Brazil	0.98	1.26	1.10	0.93
Ecuador	1.29	1.94	1.46	1.25
Peru	1.08	1.34	1.14	1.24
Saint Kitts and Nevis	0.00	0.00	0.00	0.00
Bolivia	0.98	1.10	1.15	0.74
Chile	1.00	1.26	1.07	1.14
Argentina	0.95	1.15	1.03	0.98
Paraguay	0.84	0.82	0.96	0.96
Uruguay	1.19	1.27	1.19	1.06
Belize	1.14	0.00	0.00	1.05
Antigua and Barbuda	1.92	3.36	0.00	0.00

of agricultural products exported from different countries in LA to China. Nicaragua, Costa Rica, Panama, Jamaica, and Ecuador have no trade potential of exporting three categories of agricultural products, and they all belong to the rebuilt type of trade potential. Trinidad and Tobago, Grenada, Dominica, St. Vincent and the Grenadines, and St. Kitts and Nevis are the type with huge potential, which still have large space for exporting three categories of agricultural products. Dominican, Colombia, Argentina and Paraguay also have some space in expanding exporting of three categories of agricultural products and belong to the explored type of trade potential.

The difference of trade potential for LA countries in different regions in exporting agricultural products to China varies obviously. Mexico in North America still has trade potential in exporting to China. Among the 7 countries in Central America, 4 countries belong to rebuilt type of trade potential and the other 3 countries belong to explored type of trade potential. As for 11 countries in South America, only 3 countries belong to rebuilt type of trade potential and the remaining 8 countries belong to explored type of trade potential. Among the 12 countries in the West Indies, 4 of them belong to rebuilt type of trade potential, and 6 of the remaining 8 countries have huge trade potential. West Indies has the highest level of trade potential exporting agricultural products to China, followed by Mexico and South America. Central America has the lowest trade potential.

5.3. Trade Prospect

Since the competitiveness of products can be changed by external conditions such as policies and technologies, and the trade space also has the characteristics of being easy to release but hard to increase (Tian, 2023), the trade prospect by this cross-analysis method is dynamic. Countries in the zone of promising prospect will enter the zone of bright prospect if they can transit from weak competitiveness to strong competitiveness due to the existence of trade space. However, if they fail to improve their competitiveness, they will enter the zone of dark prospect. Countries in the zone of bright prospect can achieve rapid economic growth

by continuously releasing trade space, but at the same time, they will also fall into the bottleneck prospect. Countries in the zone of dark prospect are in a very disadvantageous position in international trade. If they cannot find new economic growth approaches and innovatively explore products with competitiveness, it will be difficult for them to re-enter the cycle of trade prospect. Trade prospect of 31 LA countries exporting agricultural products to China is listed in Table 5.

There are 4 LA countries in the zone of bright prospect trading agricultural products with China, 16 countries in the zone of promising prospect, 6 countries in the zone of bottleneck prospect, 5 countries in the zone of dark prospect (see Figure 2).

Located in the northwest of LA, Mexico is in the zone of bright prospect trading agricultural products with China. Mexico is the third largest country in LA and the second largest economy. It has a superior geographical location, convenient maritime transportation, and modern agricultural production system. China and Mexico should fully use trade advantage and actively promote trade in agricultural products. China can increase the import of high value-added agricultural products such as seasonal fruits from Mexico.

The economic development of seven countries in Central America is dominated by agriculture. Their geographical location is superior. However, due to the small land area and the terrain mainly being plateaus and mountains, their exporting of agricultural products to China is limited (Qiang et al., 2013). Among them, El Salvador, Nicaragua and Costa Rica are in the zone of bottleneck prospect. Limited by trade space, their trade growth is difficult. The trade prospect of Belize, Honduras and Panama are promising. Bilateral trade with China can be promoted by trade agreement with China. For example, China can speed up the Belt and Road cooperation document with Belize and Honduras to boost a deeper exchange in economic and trade cooperation. Guatemala has no comparative advantage in China's agricultural market, and there is no trade space, so it is difficult to break through dark prospect.

In 11 countries of South America, only Suriname

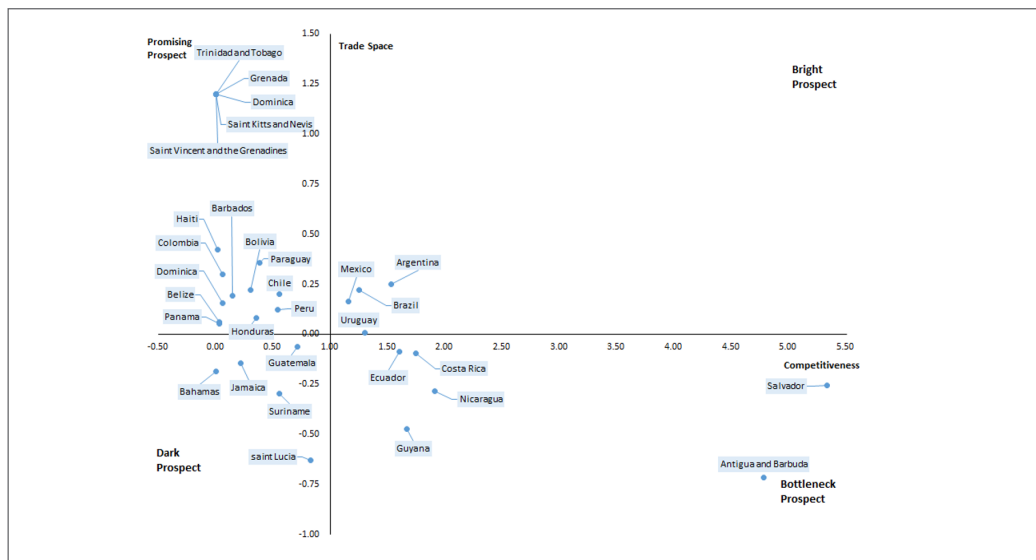
Table 5

Trade Prospect of LA countries in China's Agricultural Product Market

Country	Agricultural Products		Animal Agricultural Products		Plant Agricultural Products		Food Processing Agricultural Products	
	Competitiveness	Trade Space	Competitiveness	Trade Space	Competitiveness	Trade Space	Competitiveness	Trade Space
Mexico	1.15	0.17	3.30	-0.28	0.74	-0.13	0.61	0.30
Guatemala	0.71	-0.06	0.01	0.13	0.73	-0.53	1.23	-0.14
Honduras	0.35	0.08	0.20	-0.10	2.34	-0.64	0.02	0.39
Salvador	5.33	-0.26	0.00	1.20	0.50	-0.77	1.13	-0.46
Nicaragua	1.91	-0.29	0.05	-0.38	0.10	-0.85	2.96	-0.43
Costa Rica	1.74	-0.09	8.73	-0.68	0.24	-0.39	0.31	-0.03
Panama	0.03	0.05	1.30	-0.33	0.11	-0.12	1.05	-0.03
Haiti	0.01	0.42	0.92	-0.10	0.00	1.20	2.13	0.34
Dominican	0.06	0.16	0.03	0.21	0.19	0.30	1.29	0.03
Jamaica	0.21	-0.15	5.41	-0.95	3.39	-0.96	0.07	-0.06
Trinidad and Tobago	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20
Barbados	0.14	0.19	0.00	1.20	1.00	0.39	1.02	-0.34
Grenada	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20
Dominica	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20
saint Lucia	0.83	-0.63	0.00	1.20	0.00	1.20	1.34	-2.20
Saint Vincent and the Grenadines	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20
Bahamas	0.00	-0.19	1.16	-2.38	0.00	1.20	0.25	0.02
Guyana	1.66	-0.47	4.36	-0.54	0.00	0.86	0.00	0.54
Suriname	0.55	-0.30	3.45	-1.41	0.00	1.20	0.07	-0.73
Colombia	0.06	0.30	0.83	0.20	1.31	0.06	0.56	0.33
Brazil	1.25	0.22	0.76	-0.06	1.61	0.10	0.16	0.27
Ecuador	1.60	-0.09	2.42	-0.74	0.24	-0.26	0.08	-0.05
Peru	0.53	0.12	0.97	-0.14	0.23	0.06	2.03	-0.04
Saint Kitts and Nevis	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20
Bolivia	0.30	0.22	9.00	0.10	1.40	0.05	0.00	0.46
Chile	0.55	0.20	0.65	-0.06	1.53	0.13	0.63	0.06
Argentina	1.53	0.25	2.59	0.05	1.24	0.17	0.14	0.22
Paraguay	0.38	0.36	0.41	0.38	1.02	0.24	1.47	0.24
Uruguay	1.30	0.01	1.36	-0.07	0.55	0.01	0.16	0.14
Belize	0.03	0.06	7.70	1.20	0.00	1.20	0.03	0.15
Antigua and Barbuda	4.78	-0.72	3.55	-2.16	0.00	1.20	0.00	1.20

Note: Result based on the data from 2000 to 2019.

Figure 2

Trade Prospect of LA Countries in China's Agricultural Product Market

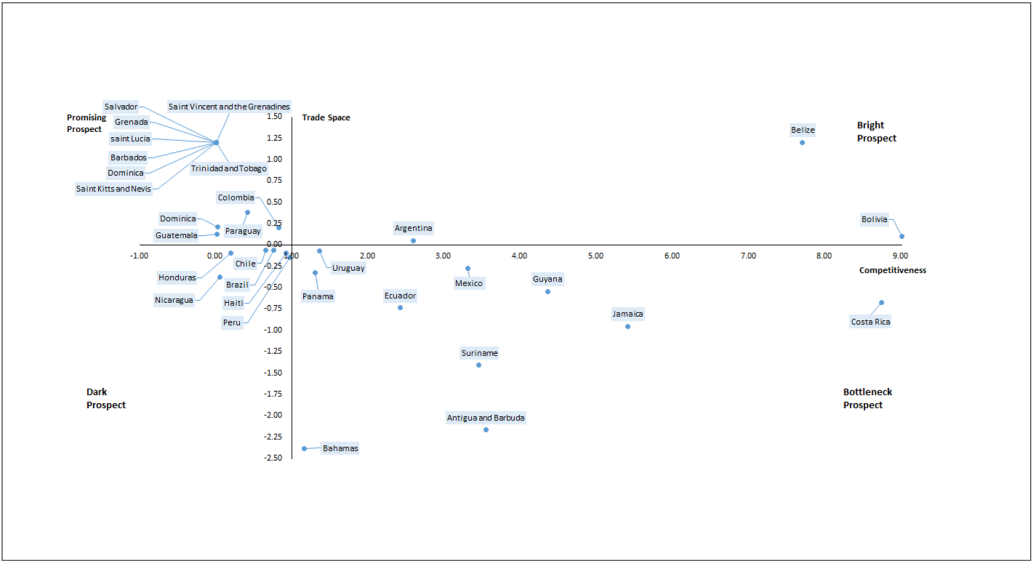
is in the zone of dark prospect, and Guyana and Ecuador are in the zone of bottleneck prospect. It is noteworthy that countries in the zone of bright trade prospect in LA are mainly concentrated in South America with vast land area. Brazil is the largest country in South America. The Amazon plain occupies one-third of its land area. It is rich in land and water resource. Its warm and humid climate is good to produce agricultural products. Brazil has developed agricultural and animal husbandry industry and the government encourages to export. Therefore, Brazil and China can continue to promote the bilateral agricultural trade under the sufficient trade space and significant comparative advantages. Argentina is the third largest economy in LA with abundant natural resources, and the important producer and exporter of grain and meat in the world. It also has the bright trade prospect in China's agricultural product market at present. The same for Uruguay. Agricultural and animal husbandry is the pillar industry of national economy. Meanwhile, its industry is also dominated by the processing industry of agriculture and animal products. Uruguay now is China's significant trade partner of agricultural products, also in the future. Columbia, Peru, Bolivia, Chile and Paraguay all belong to countries with prom-

ising trade prospect (Smutka et al., 2018). Besides, these five countries are all located along the coast of South Pacific. The development of China's Maritime Silk Road may be positive to the bilateral trade and improve comparative advantage of these countries in agricultural products (Wang et al., 2022).

In 12 countries in the West Indies, Bahamas Jamaica, Saint Lucia are in the zone of dark trade prospect. Antigua and Barbuda both are in zone of bottleneck prospect. Although the other 8 countries still have trade space in China's market. Unequal distribution of land, fragmented land, backward economy in these countries make it hard for them to improve competitiveness of their agricultural products. Lots of barriers are in the way for them to enter in the zone of bright prospect.

For animal agricultural products, only Belize, Bolivia and Argentina have bright trade prospect. There are 5 countries in the zone of dark trade prospect, including 3 major importing countries as Brazil, Peru and Chile. There are 10 countries in the bottleneck prospect and 12 countries in the promising prospect, while 8 of them are in the West Indies. Their trade prospect would not have many changes in the next few years based on reality now (see Figure 3).

Figure 3
Trade Prospect of LA Countries in China's Animal Agricultural Product Market



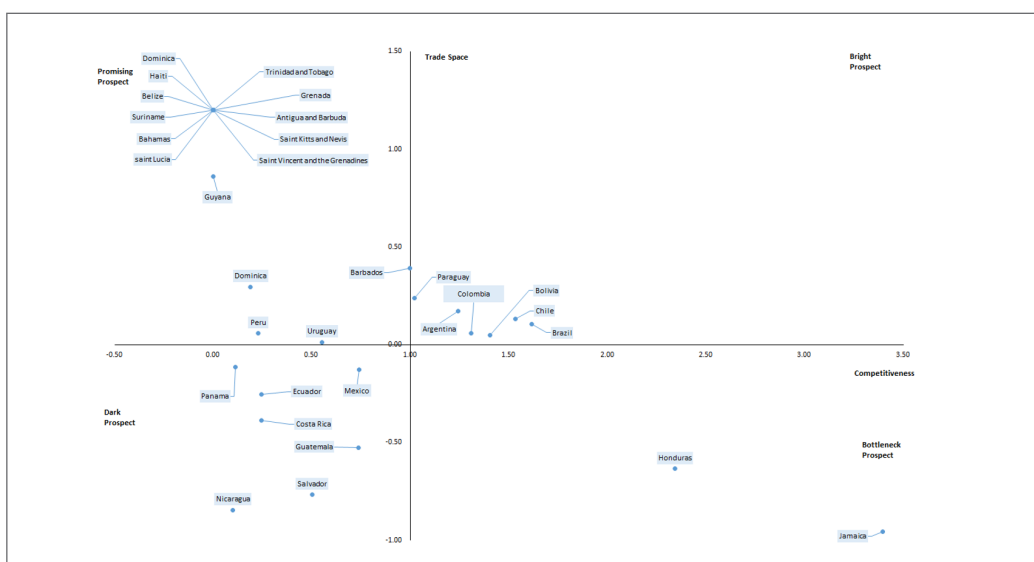
After further calculation and analysis on the exporting prospect of LA agricultural products in 24 chapters. Belize has large trade space in live animals (HS01), meat (HS02), fish and other aquatic animals (HS03). Bolivia has large trade space in live animals (HS01), dairy products, egg and other edible products of animal origin (HS04). But the two countries have relatively weak competitiveness in these agricultural products. The reason could be the two countries have lower outcomes of these agricultural products than other countries in the world. Considering the relatively weak competitiveness because of the geographic distance far away from China, better solution could be in transportation to improve the competitiveness of other animal agricultural products. Argentina has bright trade prospect in fish and crustaceans, molluscs and other aquatic invertebrates (HS03), so China could increase imports of this kind of agricultural products from Argentina. Brazil's live animals (HS01), fish (HS03), eggs and dairy products (HS04), Peru's meat (HS02), eggs and dairy products (HS04), Chile's live animals (HS01), eggs and dairy products (HS04) all have promising trade prospect in China's market. By increasing the competitiveness of these

products, it may be possible to reverse dark prospect of animal agricultural products of the three major importing countries in China's market. In countries with promising trade prospect, Colombia and Paraguay's fish and other aquatic animals (HS03) have bright trade prospect.

For plant agricultural products, 7 countries are in the zone of dark trade prospect. Except for Mexico and Ecuador, the other 5 countries are all located in Central America, only Honduras and Jamaica are in the zone of bottleneck prospect. The numbers of countries in the zone of bright prospect are the most of the three categories of agricultural products. There are 6 countries all in South America. Countries in the zone of promising prospect are mainly in the West Indies. Bahamas is one of the richest countries in the Caribbean area, but tourism and financial service are the pillars of economy, and agricultural industry is not developed. So, it is hard to turn from weak agricultural competitiveness to strong competitiveness (see Figure 4).

Among the countries in the zone of bright prospect, oil seeds, miscellaneous grains, and fruit (HS12) in Paraguay and edible fruit and nuts (HS08) in Chile are both competitive and have

Figure 4
Trade Prospect of LA Countries in China's Plant Agricultural Product Market



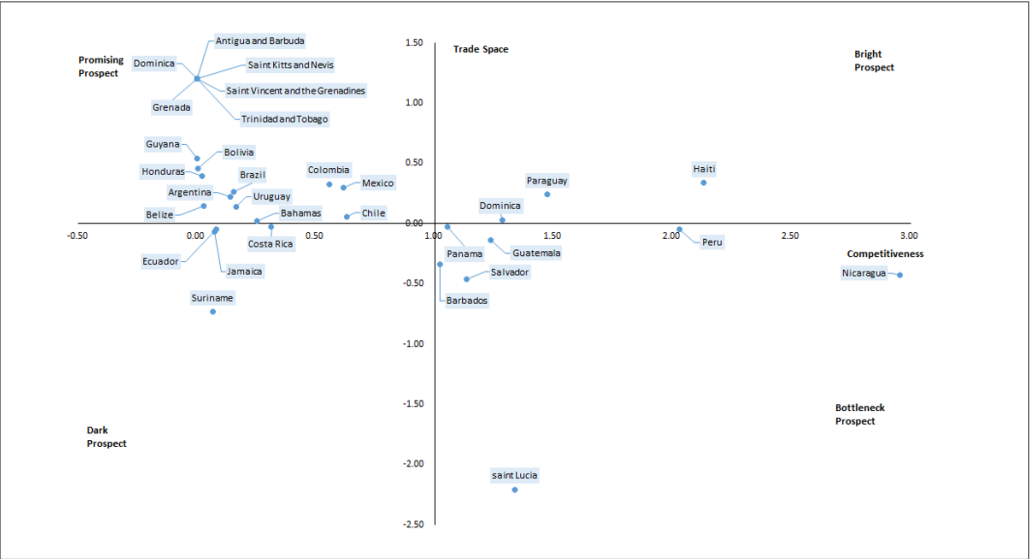
trade space in China's market, so China could increase its imports of these agricultural products from Paraguay and Chile. Live plant (HS06), flour, malt and so on (HS11), gums and lacs (HS13), vegetable plaiting materials (HS14) in Argentina, cereals (HS10), flour, malt and so on (HS11), oil seeds, miscellaneous grains, and fruit (HS12) in Columbia, live plants (HS06), edible vegetables (HS07), gums and lacs (HS13), vegetable plaiting materials (HS14) in Bolivia have large trade space. By improving their competitiveness, the exporting of these agricultural products to China could increase. Most plant agricultural products in Brazil have dark trade prospect in China's market. At present, edible fruit and nuts (HS08) in Brazil have great potential. Thus, their competitiveness in China should be improved. In addition, oil seeds, miscellaneous grains, and fruit (HS12) such as soybeans are the most important agricultural products exported from Brazil to China, which have strong competitiveness in China's market, but due to limited trade space their

exports encounter bottleneck.

For food processing agricultural products, there are 3 countries in the zone of bright prospect. Among them, Haiti is the least developed country in LA, and it is difficult for Haiti to have more trade with China. There are 4 countries in the zone of dark prospect. 4 of 7 countries in the zone of bottleneck prospect locate in Central America. There are as many as 17 countries in the zone of promising prospect, which evenly locate in different regions (see Figure 5).

Among the countries in the zone of bright prospect, main exports of Dominica are beverages, spirits and vinegar (HS22), tobacco products (HS24). These products have strong competitiveness but no trade space. The trade space for cocoa products (HS18) are dark, for sugars and sugar confectionery (HS17) are promising. Although China produces lots of sucrose, but the huge sucrose consumption makes China still need to import sucrose in some months. It is possible for China to develop su-

Figure 5
Trade Prospect of LA Countries in China's Food Processing Agricultural Product Market



crose trade with Dominica. Meat and fish products (HS16), beverages, spirits and vinegar (HS22) in Paraguay have promising prospect. Their trade with China can be achieved by improving their competitiveness. Among the countries in the zone of bottleneck prospect, Peru exports large quantity of meat and fish products (HS16), residues and waste from the food industries (HS23) to China with competitiveness, but there is no more trade space. Among the countries in the zone of promising prospect, residues and waste from the food industries (HS23) in Honduras has bright prospect.

Based on above analyses, LA has great potential in exporting agricultural products to China, but there are significant differences in the export potential of three categories of agricultural products among different countries and the overall trade potential of different regions. Only a few countries in LA are in the zone of bright trade prospect and mainly concentrate in South America. Countries with promising trade prospect locate in different regions, which mostly centralize in the West Indies. However, due to multiple and complex factors such as geography and politics, the competitiveness of agricultural products in these West Indies countries is always weak. And the pattern of trade is hard to reverse.

6. Conclusions

Based on the trade data of agricultural products between China and LA from 2000 to 2019, the conclusions are drawn as the following. First, trade relationship between China and LA in agricultural products is getting closer and closer. LA has accounted for 20 percent in China's agricultural product trade. In total trade, there is more imports of China from LA. Trade with LA in agricultural products accounts for the majority of China's trade deficit in agricultural trade.

Second, the products and regions of agricultural trade between China and LA are highly concentrated. China mainly imports plant agricultural products from LA. Specifically, more than 90 percent of them are classified into code HS02, HS03, HS08, HS12 and HS23. Brazil and Argentina are the main exporting countries which export more than 80 percent agricultural products to China.

Third, the comparative advantage of LA agricultural products in China's market in general is weak, but the number of countries with competitiveness in segmented agricultural products has showed slowly upward trend from 2000 to 2019. In terms of categories of agricultural products, food processing agricultural products of LA has the highest competitiveness, followed by animal agricultural products and plant agricultural products.

Fourth, LA countries have large trade potential in exporting agricultural products to China, and there is still trade space. Specifically, in the three categories of agricultural products in LA the export potential of plant agricultural products is the largest, then food processing agricultural products and animal agricultural products. However, significant distinguish in the export potential could be found in different countries in different categories of agricultural products. For example, in the three categories of agricultural products, Panama belongs to rebuilt type of trade potential and Dominica has huge export potential. Additionally, distinct differences in the trade potential of countries in various regions of LA exit in exporting agricultural products to China, in which the trade potential of the West Indies is the largest, followed by Mexico and South America, and the last is Central America

Fifth, based on the two-dimension cross analysis of trade future of Sino-LA agricultural products, only a few countries in LA are in the zone of bright prospect, which are Mexico, Brazil, Uruguay and Argentina. From the perspective of category of agricultural products, plant agricultural product is the category in which there are the most countries with bright prospect. From the perspective of trading region, South America is the area in which countries with bright prospect concentrate. Countries with dark prospect mainly concentrate in Central America and South America. Countries with bottleneck prospect evenly distribute in different regions. Countries with promising prospect mainly concentrate in the West Indies.

For LA exporting more high-quality agricultural products to China, agricultural trade structure in Sino-LA trade could be optimized as the following. The first is to expand the trade categories and improving trade potential. Almost all the main agri-

cultural products exported by main LA exporting countries to China are in the dark prospect. It is difficult for China to meet its demand for a large amount of high-quality agricultural products by relying on the few exporting LA countries. Therefore, it is necessary to improve the trade potential of other LA countries in exporting various agricultural products. More trade patterns and diversified agricultural products are needed in LA. For agricultural products with promising prospect, such as fish and other seafood from Belize; egg and dairy from Brazil, Peru and Chile; lac, gums, resins and vegetable plaiting materials from Argentina; grain from Colombia; sugar confectionery from Dominica; meat products, beverages, spirits and vinegar from Paraguay have huge trade space to expand their exporting to China by the promotion of policies or improving their competitiveness. For agricultural products with bright prospect, such as fish and other aquatic animals from Argentina, Colombia and Paraguay; fruit and nut from Chile; oil seeds and oleaginous fruits; miscellaneous grains from Paraguay; residues and waste from the food industries from Honduras, their trade scale could be expanded and their trade space could be released due to their great competitiveness.

The second is to make plans for cooperation according to local conditions. As there are lots of differences in the trade relationship between China and different LA countries, appropriate measures to deepen the cooperation between China and different LA countries should be made depending on the development of different regions. For most countries in the West Indies, due to the backwardness of the local economy, their agricultural development is limited by land, policy, technology. Their potential in agricultural industry could be explored by China's government assistance of foreign aid projects (Zhang & Sun, 2022). Local economy could be developed by improving agricultural productivity. For South American countries with bright prospect, especially major countries as Brazil, Uruguay and Argentina, have abundant resources and advanced technology for agricultural production. Attracting China's agricultural investment and developing the communication of science and technology in agricultural can achieve win-win cooperation and com-

mon development. Mexico is an important import source of agricultural products of China. It is difficult to deepen the bilateral trade with China because of the measures against the Chinese market in the USMCA. Problems may be solved after China joins the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

The third is to improve the quality control of exported agricultural products. LA is an important strategic trading partner of China, which can provide guaranteed agricultural products to China. However, LA countries are far inferior to the US in terms of the quality of agricultural products per unit price. China has been in trade deficit in agricultural products with LA for years and would not import low-quality agricultural products. Thus, China will further strengthen the quality supervision of agricultural products exported from LA (Boza et al., 2022). This could push the LA countries to improve their quality of exporting agricultural products.

Fourth is to promote the regional integration between China and LA and the positive effect of trade agreement. Free trade agreement is an important way to promote bilateral regional economic integration, which can promote the growth of trade scale and the development of economic and trade relationship (Jenkins et al., 2008). China has signed free trade agreement with Chile, Costa Rica and Panama. Bilateral trade volume has grown significantly. LA is an extension of the Maritime Silk Road. China will speed up the bilateral cooperation with LA countries in the construction of the Belt and Road, which provide corresponding preferential policy and trade facilitation for Sino-LA agricultural trade. So far, China has signed the Memorandum of Understanding (UMO) on the Belt and Road with five countries as Panama, Uruguay, Grenada, Antigua and Barbuda and Nicaragua, the Memorandum of Understanding (UMO) on the Maritime Silk Road with Barbados, cooperation documents on jointly building the Belt and Road with 12 countries as Venezuela, Dominica, Chile, Peru, Ecuador, Trinidad and Tobago, Suriname, Bolivia, Guyana, El Salvador, Cuba and Nicaragua. In addition, Brazil and Argentina are very important trading partners of China in LA. The two countries intend to promote the construction of a multilateral

free trade zone with China, which can accelerate the launch of negotiations on Sino-South America free trade agreement.

The fifth is to attract investment and strengthen the technology cooperation in agricultural industry between China and LA. Agricultural investment is characterized by low risk and high returns. As a basic industry, agricultural industry sustains people's livelihood. Effective investment in agricultural can have both economic and social effects, which is of great significance for ensuring global food security and helping some LA countries to be away from poverty. China's investment in agriculture in LA countries develops local production resources. The agricultural production and processing demonstration zones and agricultural investment and development zones invested locally can help LA countries to build entire industrial chain of agricultural production, which can improve local competitiveness of agricultural products. Cooperation in agricultural technology could be promoted by jointly building agricultural technology research and development center, which matches the experience from developed countries and local conditions of LA countries and develop technologies that can be implemented locally as to improve the production and processing level of agricultural products in LA countries.

7. Limitations and Future Research

There are three main limitations of the research. The first is about data. The paper classifies agriculture products according the HS code. Trade data in analyses are from UN Comtrade database. The research period covers from 2000 to 2019. In the long period, the trade data of some countries under the HS classification could be missing. And there would be difference in classifying agricultural products in exporting country and importing country. All these may lead to the bias of final results. The second is about the explained variables in the extended gravity model. In constructing extended gravity model, the research chooses main factors affecting agricultural trade between LA and China, but not all. This may not reflect the whole situation of agricultural trade between LA and China. The third is the period for research. In the research, trade prospect

of LA exporting agricultural products to China is calculated and analyzed based on the data of 2019. After 2019, covid-19, trade friction, wars and so on change the interests of both countries. Updated research should be done to incorporate the recent changes into the analyses.

The paper provides the overall analysis of trade prospect of 31 countries in LA exporting three categories agricultural products to China. In it, food processing agricultural products are the most important for the upgrading of agriculture industry in LA. The future research could be in depth research in LA exporting food processing agricultural products to China.

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Annex A

The HS assigns specific six-digit codes for varying classifications and commodities. Agricultural products mainly are classified into 24 Chapters from Section 1 to 4. Section 3 only contains Chapter 15 with low volume of exporting. For empirical test, agricultural products

in 24 Chapters in HS code are classified into three types as animal agricultural products (HS01-HS05), plant agricultural products (HS06-HS14) and food processing agricultural products (HS15-HS24) (see Table A.1)

Table A.1
Three Types of Agricultural Products

Types	Section	Chapter
Animal Agricultural Products	Section I (live animals; animal products)	HS01 Live animals, HS02 Meat and edible meat offal, HS03 Fish and Crustaceans, molluscs and other aquatic invertebrates, HS04 Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included, HS05 Products of animal origin, not elsewhere specified or included
Plant Agricultural Products	Section II (Vegetable Products)	HS06 Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage, HS07 Edible vegetables and certain roots and tubers, HS08 Edible fruit and nuts; peel of citrus fruit or melons, HS09 Coffee, tea, mate and spices, HS10 Cereals, HS11 Products of the milling industry; malt; starches; inulin; wheat gluten, HS12 Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder, HS13 Lac; gums, resins and other vegetable saps and extracts, HS14 Vegetable plaiting materials; vegetable products not elsewhere specified or included
	Section III (Animal, vegetable or microbial fats and oils a) their cleavage products; prepared edible fats; animal or vegetable waxes)	HS15Animal, vegetable or microbial fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes
Food Processing Agricultural Products	Section IV (Prepared foodstuffs; Beverages, spirits and vinegar; Tobacco and manufactured tobacco substitutes; products, whether or not containing nicotine, intended for inhalation without combustion; other nicotine containing products intended for the intake of nicotine into the human body)	HS16 Preparations of meat, of fish, of crustaceans, molluscs other aquatic invertebrates, or of insects, HS17 Sugar and sugar confectionery, HS18Cocoa and cocoa preparations, HS19 Preparations of cereals, flour, starch or milk; pastrycooks' products, HS20 Preparations of vegetables, fruit, nuts or other parts of plants, HS21 Miscellaneous edible preparations, HS22 Beverages, spirits and vinegar, HS23 Residues and waste from the food industries; prepared animal fodder, HS24 Tobacco and manufactured tobacco substitutes; products, whether of not containing nicotine, intended for inhalation without combustion; other nicotine containing products intended for the intake of nicotine into the human body

Source: Based on WCO HS, <https://www.wcotradetools.org/en/harmonized-system>, June 7, 2022.

Annex B

Thirty-three countries in this research are listed as in Table B.1.

Table B.1
33 Countries in LA

Region	Country
North America (1)	Mexico
Central America (7)	Guatemala, Belize, Honduras, Salvador, Nicaragua, Costa Rica, Panama
South America (12)	Venezuela, Colombia, Guyana, Suriname, Brazil, Ecuador, Peru, Bolivia, Chile, Argentina, Paraguay, Uruguay
West Indies (13)	Cuba, Haiti, Dominica, Jamaica, Trinidad and Tobago, Barbados, Grenada, Dominica, Saint Lucia, Saint Vincent and the Grenadines, Bahamas, Saint Kitts and Nevis, Antigua and Barbuda

Annex C

Table C.1
China's Imports of Three Agricultural Product from LA From 2000 to 2019 and their Share (10 million dollars, %)

Year	Animal Agricultural Products		Plant Agricultural Products		Food Processing Agricultural Products	
	Imports	Share	Imports	Share	Imports	Share
2000	8.1	4.92	95.5	58.27	60.3	36.80
2001	8.4	4.22	140.4	70.70	49.8	25.08
2002	9.2	3.79	138.0	56.86	95.5	39.35
2003	9.6	2.20	258.3	59.08	169.3	38.72
2004	15.3	2.96	281.5	54.39	220.8	42.65
2005	21.6	3.68	349.3	59.38	217.3	36.95
2006	20.5	3.49	393.3	67.05	172.8	29.46
2007	24.5	2.68	559.5	61.15	331.0	36.17
2008	26.3	1.92	909.3	66.49	432.0	31.59
2009	31.5	2.60	774.9	63.94	405.5	33.46
2010	56.8	3.55	1,160.6	72.55	382.3	23.90
2011	102.5	4.64	1,579.3	71.55	525.5	23.81
2012	122.9	5.42	1,582.9	69.75	563.6	24.83
2013	159.4	5.54	2,185.2	75.92	533.7	18.54
2014	184.1	6.79	2,134.6	78.75	392.0	14.46
2015	272.4	9.92	2,082.8	75.89	389.4	14.19
2016	355.8	13.82	1,891.0	73.45	327.7	12.73
2017	402.3	12.65	2,455.2	77.20	322.7	10.15
2018	637.2	15.36	3,077.6	74.18	434.0	10.46
2019	1,218.7	28.70	2,668.1	62.83	359.4	8.46

Source: Calculated based on the data from UN Comtrade, <https://comtrade.un.org/>. June 7, 2022.

Annex D

Table D.1
China's Imports Share of Agricultural Products in 24 Chapters from LA between 2000 and 2019 (%)

Year	1	2	3	4	5	6	7	8	9	10	11	12
2000	0.01	1.24	3.56	0.01	0.11	0.02	0.10	4.93	0.02	0.00	0.00	53.11
2001	0.02	1.04	3.00	0.05	0.11	0.02	0.06	1.18	0.06	0.25	0.02	69.00
2002	0.00	0.58	3.15	0.00	0.05	0.04	0.01	1.59	0.04	0.02	0.00	54.99
2003	0.01	0.48	1.66	0.01	0.04	0.04	0.00	0.66	0.03	0.00	0.00	58.20
2004	0.00	1.16	1.72	0.02	0.06	0.05	0.01	0.31	0.03	0.08	0.00	53.77
2005	0.00	1.83	1.69	0.06	0.09	0.06	0.00	0.24	0.05	0.10	0.00	58.82
2006	0.00	0.82	2.49	0.10	0.08	0.07	0.01	0.46	0.04	0.00	0.02	66.24
2007	0.00	0.58	1.91	0.14	0.05	0.06	0.01	0.54	0.03	0.00	0.01	60.41
2008	0.00	0.32	1.52	0.05	0.04	0.04	0.01	0.46	0.03	0.01	0.01	65.84
2009	0.04	1.00	1.41	0.10	0.05	0.06	0.00	0.49	0.03	0.06	0.01	63.12
2010	0.06	2.15	1.08	0.24	0.04	0.04	0.00	0.61	0.03	0.06	0.03	71.59
2011	0.13	2.73	1.46	0.27	0.05	0.04	0.00	1.00	0.05	0.36	0.01	69.94
2012	0.18	3.55	1.30	0.33	0.04	0.03	0.00	1.94	0.08	0.17	0.01	67.41
2013	0.00	3.25	1.39	0.85	0.04	0.03	0.00	2.05	0.05	0.17	0.01	73.49
2014	0.21	4.12	1.79	0.65	0.02	0.05	0.01	3.47	0.06	0.10	0.02	74.87
2015	0.17	7.37	2.15	0.22	0.02	0.05	0.00	3.54	0.10	0.21	0.01	71.84
2016	0.01	11.10	2.50	0.19	0.02	0.07	0.00	5.08	0.10	0.15	0.02	67.85
2017	0.08	9.95	2.48	0.13	0.02	0.09	0.00	3.35	0.11	0.01	0.01	73.46
2018	0.04	11.08	4.03	0.19	0.02	0.05	0.00	4.17	0.16	0.03	0.01	69.59
2019	0.02	20.43	8.01	0.22	0.03	0.05	0.01	6.06	0.10	0.16	0.01	56.26
Total	0.07	7.37	2.85	0.28	0.03	0.05	0.01	2.97	0.08	0.12	0.01	67.66
Year	13	14	15	16	17	18	19	20	21	22	23	24
2000	0.01	0.08	3.32	0.50	3.57	0.05	0.00	0.15	0.04	0.53	25.57	3.07
2001	0.01	0.10	0.64	0.55	4.95	0.06	0.01	0.32	0.13	0.80	14.78	2.83
2002	0.15	0.01	14.84	0.48	3.05	0.04	0.01	0.31	0.07	0.79	16.91	2.87
2003	0.05	0.09	25.56	0.31	1.65	0.02	0.00	0.44	0.02	0.59	8.85	1.27
2004	0.06	0.07	26.26	0.53	1.80	0.01	0.00	0.61	0.33	0.63	10.50	1.97
2005	0.06	0.05	15.44	0.42	2.33	0.02	0.00	0.67	0.09	0.41	13.31	4.23
2006	0.05	0.16	13.53	0.70	1.34	0.01	0.01	0.85	0.04	0.58	11.08	1.32
2007	0.06	0.03	21.27	0.41	1.89	0.02	0.00	0.71	0.06	0.56	8.11	3.14
2008	0.05	0.04	17.73	0.55	1.59	0.02	0.00	0.53	0.10	0.56	7.56	2.94
2009	0.09	0.08	17.19	0.28	2.12	0.01	0.00	0.64	0.07	0.59	8.94	3.62
2010	0.08	0.11	7.58	0.37	4.81	0.02	0.00	0.53	0.05	0.66	7.40	2.49
2011	0.06	0.07	6.47	0.62	6.98	0.04	0.00	0.58	0.06	0.53	6.35	2.18
2012	0.04	0.06	8.83	0.54	6.13	0.08	0.00	0.48	0.08	0.83	5.30	2.57
2013	0.07	0.06	4.62	0.33	6.34	0.03	0.01	0.34	0.05	0.66	4.17	1.98
2014	0.09	0.08	3.21	0.63	4.12	0.03	0.01	0.37	0.05	0.69	3.73	1.62
2015	0.07	0.06	2.69	0.36	4.17	0.07	0.00	0.26	0.08	1.21	4.15	1.20
2016	0.09	0.08	1.68	0.17	3.94	0.08	0.00	0.29	0.05	1.30	3.81	1.39
2017	0.11	0.06	1.53	0.25	0.99	0.03	0.01	0.28	0.04	1.36	4.55	1.12
2018	0.11	0.05	2.69	0.27	0.92	0.09	0.00	0.24	0.04	1.43	3.72	1.05
2019	0.13	0.05	1.81	0.28	0.78	0.03	0.01	0.23	0.02	1.08	3.19	1.02
Total	0.08	0.07	6.17	0.38	3.19	0.05	0.00	0.38	0.06	0.95	5.41	1.77

Annex E

Table E.1

The top 5 categories of China's Imports of Agricultural Products from LA in 2000 and 2019

2000	2019
HS 12 (oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder),	HS 12 (oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder)
HS 23 (residues and waste from the food industries; prepared animal fodder)	HS 02 (meat and edible meat offal)
HS 08 (edible fruit and nuts; peel of citrus fruit or melons)	HS 03(fish and crustaceans, molluscs and other aquatic invertebrates)
HS 17 (sugar and sugar confectionary),	HS 08 (edible fruit and nuts; peel of citrus fruit or melons)
HS 03 (fish and crustaceans, molluscs and other aquatic invertebrates and Crustacean, Mollusk and other Aquatic Invertebrate)	HS 23 (residues and waste from the food industries; prepared animal fodder)

Annex F

Table F.1

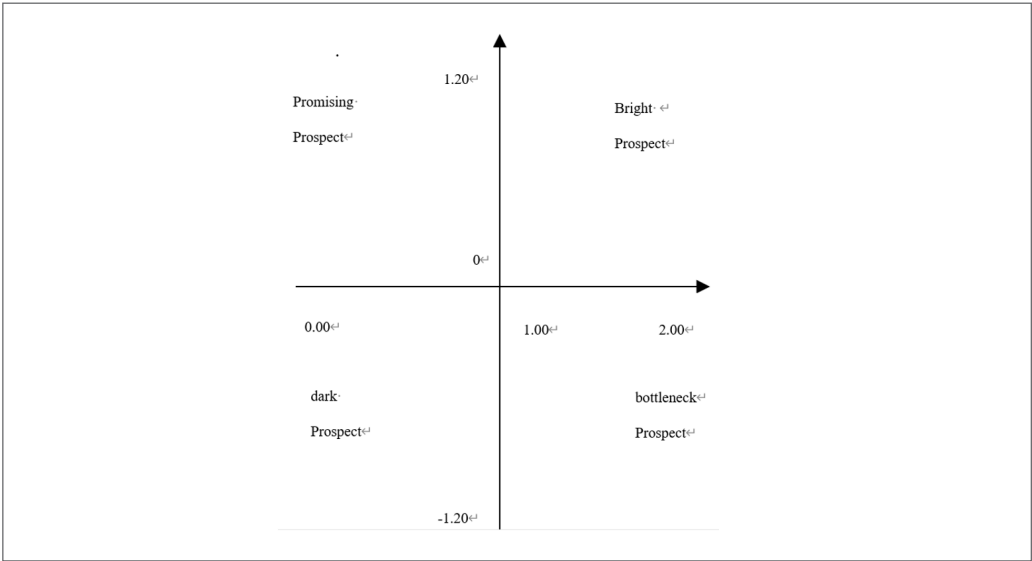
China's Imports of Agricultural Products from Main LA Countries between 2000 and 2019 (%)

Year	Brazil	Peru	Chile	Argentina	Uruguay	Total Share
2000	26.89	20.14	3.83	38.60	1.50	90.96
2001	32.57	11.82	5.84	43.53	0.91	94.66
2002	42.94	13.46	6.96	31.86	0.64	95.86
2003	38.35	6.57	4.09	47.95	0.38	97.34
2004	44.56	8.83	3.58	40.08	0.45	97.51
2005	38.86	10.41	4.47	42.77	0.47	96.97
2006	47.25	8.44	5.23	37.20	0.72	98.85
2007	38.64	6.27	4.00	47.43	0.42	96.76
2008	48.67	6.33	3.36	38.54	0.48	97.39
2009	60.68	6.39	4.60	25.00	0.95	97.63
2010	57.41	6.13	3.26	29.65	1.37	97.82
2011	63.56	5.77	3.38	23.34	1.57	97.62
2012	67.69	4.97	4.20	17.88	2.83	97.58
2013	70.44	3.88	4.16	15.37	3.78	97.62
2014	69.97	3.90	5.16	14.65	3.75	97.43
2015	66.88	4.19	5.32	16.88	3.18	96.48
2016	68.71	3.45	7.83	14.46	2.94	97.41
2017	71.79	4.63	5.92	10.85	3.88	97.09
2018	75.34	3.96	6.24	7.44	2.75	95.74
2019	61.39	3.94	7.91	14.63	3.88	91.76

Source: Calculated based on the data from UN Comtrade. <https://comtrade.un.org/>. June 7, 2022.

Annex G

Figure G.1
Two-dimensional Cross-analysis for Trade Prospect



Annex H

Figure H.1
Animal Agricultural Products Exporting from LA Countries to China between 2000 and 2019

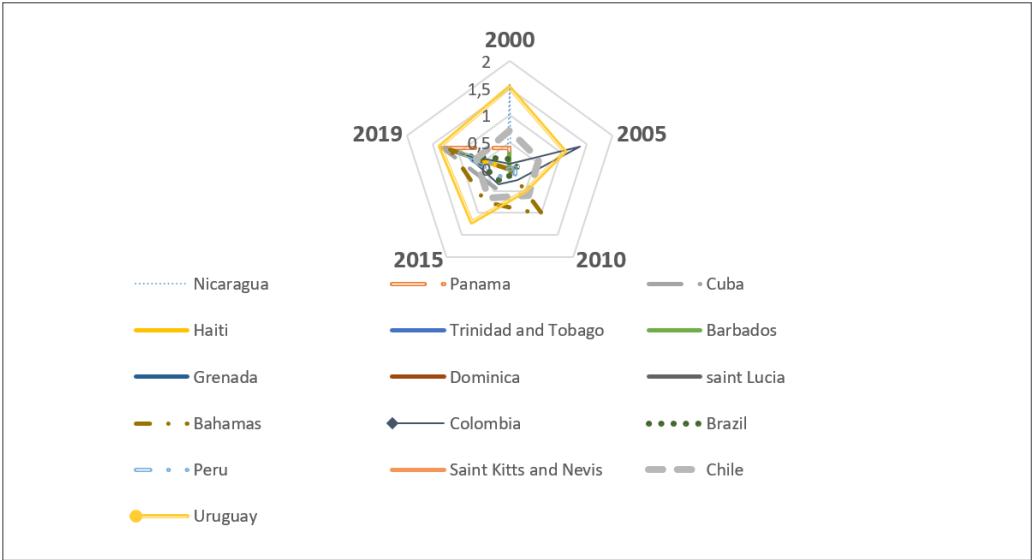
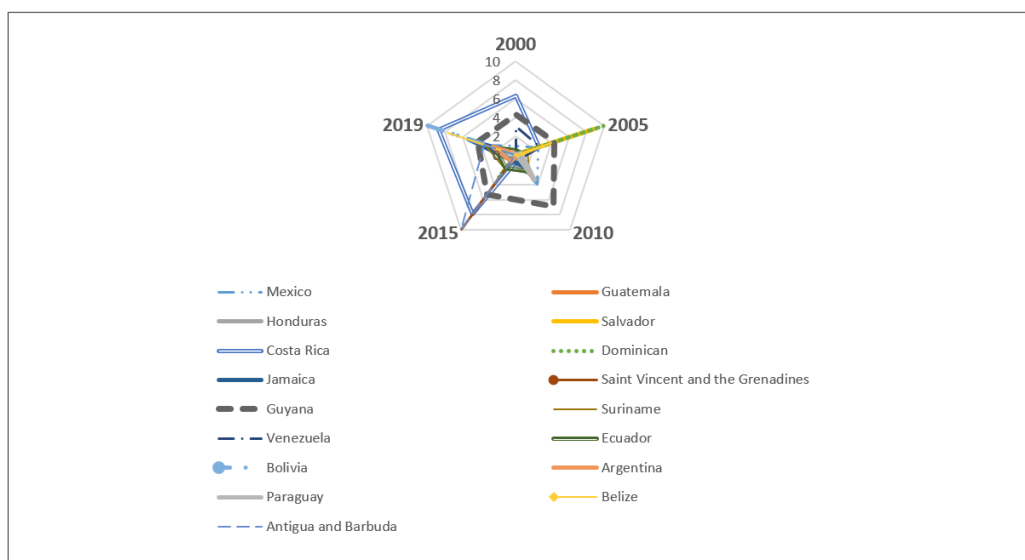


Figure H.1*Animal Agricultural Products Exporting from LA Countries to China between 2000 and 2019) (Continued)*

Source: Calculated based on the data from UN Comtrade. <https://comtrade.un.org/>. June 7, 2022.

Annex I

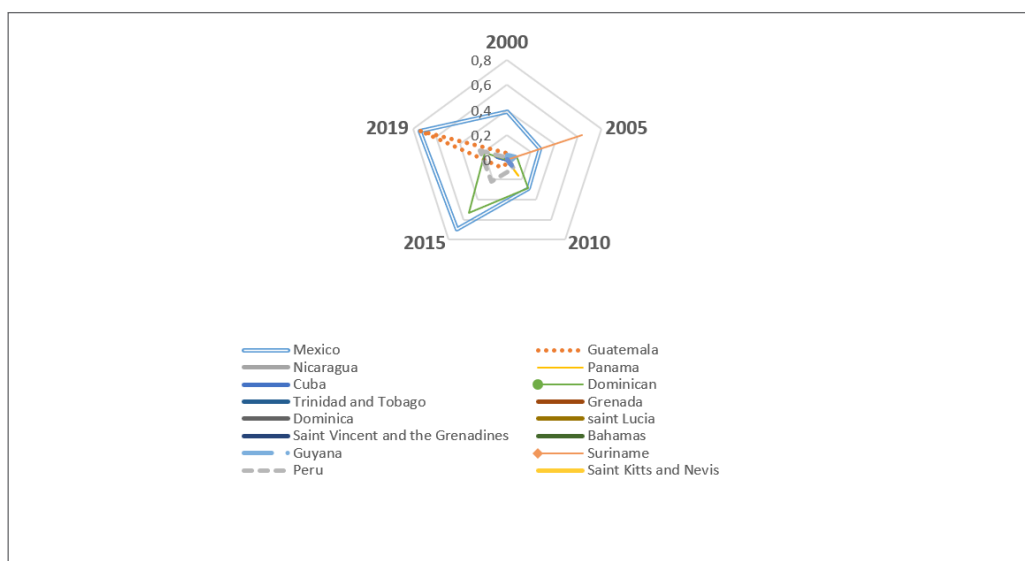
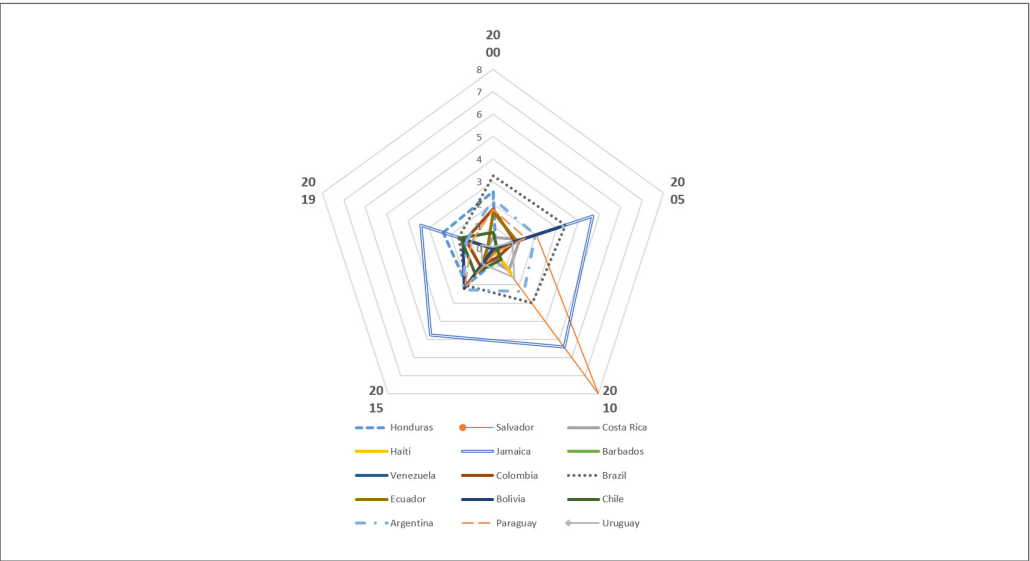
Figure I.1*Plant Agricultural Products Exporting from LA Countries to China between 2000 and 2019*

Figure I.1
Plant Agricultural Products Exporting from LA Countries to China between 2000 and 2019 (Continued)



Source: Calculated based on the data from UN Comtrade. <https://comtrade.un.org/>. June 7, 2022.

Annex J

Figure J.1
Food Processing Agricultural Products Exporting from LA Countries to China between 2000 and 2019

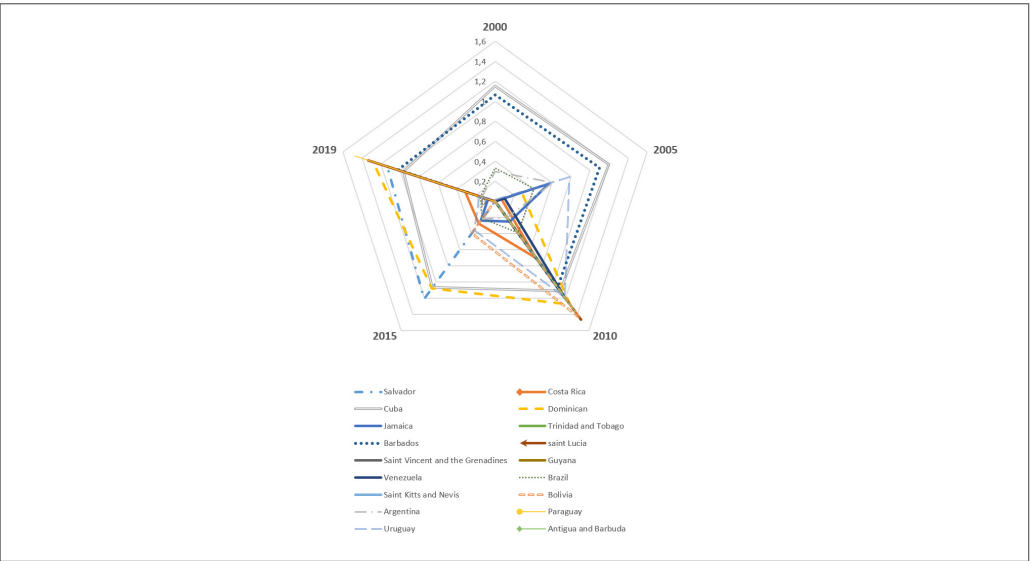
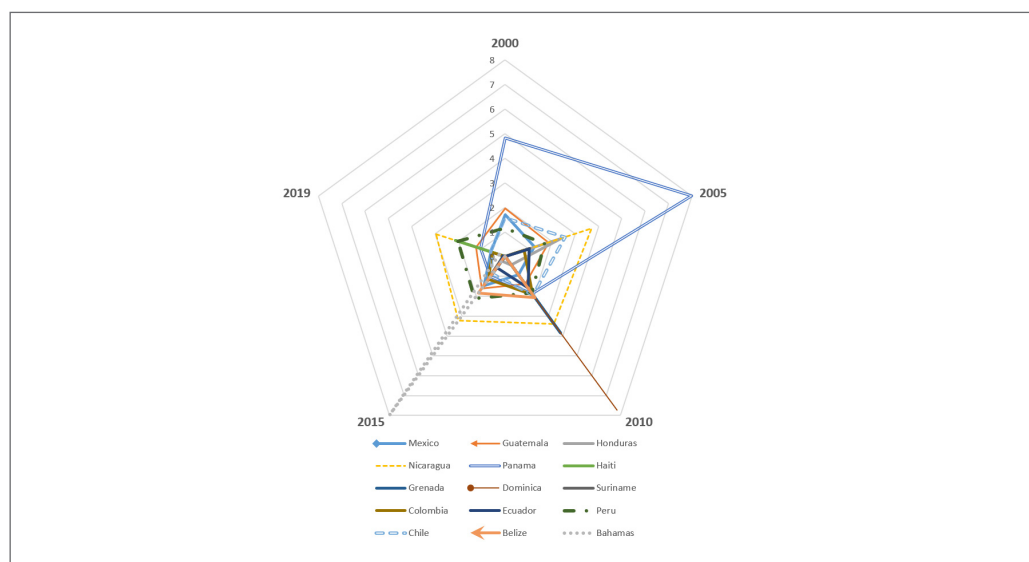


Figure J.1*Food Processing Agricultural Products Exporting from LA Countries to China between 2000 and 2019 (Continued)*

Source: Calculated based on the data from UN Comtrade. <https://comtrade.un.org/>. June 7, 2022.