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Competitive Advantages of China's Agricultural Exports in the Outward-Looking Belt and Road Initiative

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1 Introduction

China's agricultural production and exports have undergone significant structural changes since market reforms started in China in 1978, allowing subsequent changes in comparative advantages of the country, such as shifting from land intensive agriculture to labor intensive manufacturing (Lim and Feng 2005). Consequently, the commodity composition of trade has changed and the export portfolio has become more consistent with China's comparative advantage, compared with the pre-reform period (Lardy 1994). With income growth and significant changes in consumption tastes and preferences during the 1980s to 2000s, there was a transition from chronic shortages to an equilibrium, or even excess, in supply of agricultural products in China (Cheng 2007), allowing the country to be self-sufficient in the main crops and to become a net

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exporter of many agricultural commodities. However, Wailes et al. (1998) pointed out that after 20 years of reforms the growth rates for China's agricultural trade were still slower than for total trade, and that the share of agricultural trade in total trade had declined, while agricultural trade roughly adhered to the laws of comparative advantage.

There have been attempts to study China's foreign trade policy. Dohmen (1976), Lu (1997), Mariani (2013), Hamrin and Zhao (1995), Wu (2006), and Liberthal (2004) provided an in-depth analysis of China's general foreign trade policy. Cass et al. (2003), Lardy (2002), Panitchpakdi and Clifford (2002), and Anderson et al. (2010) studied the implications of China's membership of the WTO on both China's internal policies and foreign trade. Recent studies of China's contemporary trade policy in relation to the BRI by Bondaz et al. (2015), Zhang (2016), Shah (2016), and Wong et al. (2017) acknowledged that the BRI could be an active driver of China's exports to Eurasia, but warned that the effective implementation of a trade policy over the medium- to long-term depended on the utilization of competitive advantages. He et al. (2016) carried out empirical research on agricultural trade between China and the BRI countries and concluded that both sides should strengthen and diversify trade cooperation on agricultural products on the basis of existing bilateral and multilateral mechanisms to achieve common development. However, according to Wong et al. (2017), despite China's desire to explore new market opportunities, increasing influence of China in Eurasia through the BRI will inevitably face antagonism from key regional economic powers. In such conditions, soft economic power and development of existing competitive advantages may provide a background for the promotion of China's exports in the region. Analysis of competitive advantages in China's export of agricultural products has received little attention because most studies on the competitiveness of China's exports were done on manufactured exports. This chapter attempts to analyze China's comparative and competitive advantages in trade of agricultural products. The authors' contribution is to test a tool for the assessment of the competitiveness of various agricultural commodities in China's export portfolio and to develop a set of policy measures aimed at diversifying exports for a nation's comparative advantage in terms of the implementation of the BRI.

2 Literature Review

There have been many approaches to measuring competitive advantages and export specialization of countries. One of the commonly accepted methodologies is the Balassa index of revealed comparative advantage (RCA) (Balassa 1965). In relation to China's agricultural trade, Tian et al. (2016) employed the Balassa index to assess the trade margins of China's agri-food export growth. Fang and Beghin (2000) studied comparative advantages in China's agricultural trade and discovered that the production of grains and oilseeds suffered from a comparative disadvantage over other crops in China. He (2010) modified the RCA index to the study the dynamics of China's agricultural trade patterns and found that China's comparative advantages had deteriorated during the previous decades. He et al. (2016) used RCA coupled with the Trade Complementarity Index to empirically analyze trade competition and complementarity of agricultural products between China and the BRI countries. The conclusion was that trade competition and complementarity of agricultural products between China and the BRI countries coexisted, but its complementarity appeared to be more remarkable.

However, the Balassa index by itself is insufficient for describing the competitive positions of particular products, since it identifies revealed comparative advantages rather than determining the underlying sources of such advantages. Also, the Balassa index does not allow for the division of comparative advantages into natural and acquired ones. One of the most efficient tools for identifying competitive advantages regarding export volumes of a country and its relative trade shares is the Vollrath index of relative trade advantage (RTA). It is a comparison of how well a country has performed in exporting a particular set of products compared to the total export of all its products (Vollrath 1985). The Vollrath index considers both exports and imports, and demonstrates net trade advantages and disadvantages. However, when assessing the competitiveness of particular products in a country's export portfolio, it is crucial to examine the extent to which the comparative advantages are consistent with competitiveness (Seyoum 2007).

There have been many attempts to increase the consistency between various measures and improve the relevance of analyses. One of the most interesting methods is testing RCA and RTA values using the Lafay index. This index considers the difference between each product's normalized trade balance and the overall normalized trade balance (Maitah et al. 2016). It also weights each product's contribution according to its particular importance in trade. Maitah et al. (2016) used a three-indices approach for the analysis of the positions of agricultural producers both in comparison to domestic producers from other sectors and in relation to their foreign competitors. Ishchukova and Smutka (2013a, b) analyzed specialization and competitive performance in the Russian agricultural sector and identified a group of products with relatively stable comparative advantage. Ishchukova (2013) and Benesova et al. (2017) implemented Balassa, Vollrath, and Lafay indices to discover the comparative advantages of agricultural exports and to distinguish several groups of commodities in the export portfolio of a country, depending on the amount of foreign exchange, comparative advantage, and trade balance.

A three-indices approach seemed very promising for assessing the competitiveness of an export portfolio, since it reveals comparative advantages of a country in its exports, discovers competitive advantages in both exports and imports, and weights each product's contribution to the export portfolio. However, the approach has never been implemented to assess comparative and competitive advantages of China's agricultural export. As distinguished from existing works for other countries, in this chapter the authors apply the three indices to the same dataset in relation to China and calculate the Lafay index not for individual regions, but for the same array of products constituting China's export portfolio. As a logical conclusion to the consequent comparison of the indices' values, products have been divided into groups depending on the concurrence of the indices, not on the relationship between comparative advantage and trade balance. Additionally, for each group there have been developed differentiated policy measures aimed at support, promotion, development, or establishment of a competitive advantage.

3 Methodology

To assess the competitiveness of particular products in a country's export portfolio, the study employed the five-stage process. In the first stage, the authors discovered the revealed comparative advantage of a country using the Balassa index:

$$RCA = \left(X_{ij} / X_{it}\right) / \left(X_{nj} / X_{nt}\right) = \left(X_{ij} / X_{nj}\right) / \left(X_{it} / X_{nt}\right), \quad (14.1)$$

where *RCA* = revealed comparative advantage; *X* = export; *I* = country; *j* = commodity group (domestic market); *t* = commodity group (international market); and *n* = group of countries.

According to the Balassa index, a country specializes in the export of a particular product if the market share of such product is above average or, equivalently, if the weight of the product in a country's exports is higher than the weight of the same product in the reference area's exports. For the purposes of this study, the Balassa index determines what commodity groups take the most important part in a country's export structure.

In the second stage, after identifying the products for which RCAs in export were above 1, the authors assessed relative trade advantages for the same dataset using the Vollrath index:

$$RTA = \left(\left(X_{ij} / X_{it}\right) / \left(X_{nj} / X_{nt}\right)\right) - \left(\left(M_{ij} / M_{it}\right) / \left(M_{nj} / M_{nt}\right)\right), \quad (14.2)$$

where *RTA* = relative trade advantage; *X* = export; *M* = import; *i* = country; *j* = commodity group (domestic market); *t* = commodity group (international market); *n* = group of countries.

After discovering the products for which RTAs were above 0, the authors applied the results to the RCAs, compared the two sets of products, and identified those export items that had advantages on both indices. The use of the two indices for the same dataset reduced the risk of random error.

Since both RCAs and RTAs are structural, it is important to eliminate the influence of cyclical factors (Zaghini 2003), which is why at the third stage the authors calculated the Lafay index:

$$LI_{ij} = \left(1000 / Y_i\right) * \left(2^* \left(X_{ij} M_i - X_i M_{ij}\right)\right) / \left(X_i + M_i\right), \qquad (14.3)$$

where: LI = Lafay index; X = export; M = import; i = country; j = commodity group.

After calculating the three indices for the same set of products, the authors identified those export items that had competitive advantages in all three cases, those that had no advantages at all, and those with advantages on one or two of the indices. At the fourth stage, the authors divided them into four groups according to their competitiveness (see Table 14.1).

When RCA > 1, RTA > 0, and LI > 0, the authors assumed that a product was positively competitive since all three indices showed an advantage. When a product showed an advantage on one or two of the indices, it was considered as conditionally competitive. For the remaining products not included in PC or CC groups, an arithmetical average of each of the three indices (RCA_{CNC+NC}, RTA_{CNC+NC}, LI_{CNC+NC}) was calculated. Those commodity groups where all three values of RCA_{av}, RTA_{av}, and LI_{av} were below RCA_{CNC+NC}, RTA_{CNC+NC}, LI_{CNC+NC}, respectively, were considered non-competitive. Export items for which at least one of the values of RCA_{av}, RTA_{av}, and LI_{av} was above RCA_{CNC+NC}, RTA_{CNC+NC}, LI_{CNC+NC}, respectively, were placed in the conditionally non-competitive group.

Table 14.1 Grouping of export products on their competitiveness

Groups	Competitiveness Criteria
Positively competitive (PC)	$RCA_{av} > 1$ $RTA_{av} > 0$ $LI_{av} > 0$
Conditionally competitive (CC)	$RCA_i > 1$, or/and $RTA_i > 0$, or/and $LI_i > 0$
Conditionally non-competitive (CNC)	$RCA_{av} > RCA_{CNC+NC}$
	$RTA_{av} > RTA_{CNC+NC}$
	$LI_{av} > LI_{CNC+NC}$
Non-competitive (NC)	$RCA_{av} < RCA_{CNC+NC}$
	$RTA_{av} < RTA_{CNC+NC}$
	$LI_{av} < LI_{CNC+NC}$

Source: Authors' development

In the final stage, the measures that should be applied to either support or increase competitiveness were identified so that production and export of PC and CC products could be supported in such a way as to implement or develop competitive advantage and thus expand exports; while CNC and NC products could be reoriented on the domestic market.

The above five-stage approach has been tested in the case of Chinese agricultural exports for 1995–2015 (32 major groups of export commodities).

4 China's Trade in Agricultural Commodities

China is one of the major global producers of agricultural products. Despite the world's biggest population of over 1.3 billion people, limited agricultural resources, and domination of smallholders in agriculture, China is largely self-sufficient in food, except for few agricultural commodities. With the fast development of China's foreign trade, China's trade in agricultural products has also grown rapidly. In 2015 China became the fourth-largest agricultural exporter, after the EU, the USA, and Brazil; and the fourth-largest agricultural importer, following the EU, the USA, and Japan. China has a diverse array of agricultural exports, the most important of which are fish (11.9% of total agricultural export in 2015), vegetables (10.8%), roots and tubers both prepared and preserved (10.5%), aquatic invertebrates (9.9%), crustaceans and mollusks (8.4%), and fruit and nuts (7.8%).

Despite the rapid growth of China's trade in agricultural commodities, many experts acknowledge that the country has a comparative advantage in producing and exporting only labor intensive horticultural products, such as vegetables and fruits (Huang and Chen 1999; Bonnariva 2011; Ni 2013; Lim and Feng 2005; Cheng 2007). Considering the limits of land, water, and other resources, it is seen as difficult for China to export large quantities of land intensive crops that are vital to China's food security (Ni 2013). China's agricultural growth depends much more on domestic demand, and agricultural resources are mainly used to produce major crops for domestic consumption (Cheng 2007). However, there is

a lot of room for improvement in the competitiveness of items other than labor intensive products in China's export portfolio.

For a better understanding of the current coherence between comparative and competitive advantages in China's agricultural exports, the authors calculated Balassa (RCA), Vollrath (RTA), and Lafay (LI) indices for the major commodity groups in China's export portfolio.

The Balassa index measures the degree of specialization of products in China's export portfolio. A country reveals comparative advantages in products for which RCA > 1. For China, fish and aquatic invertebrates, vegetable roots and tubers, crustaceans and mollusks, and tea and mate revealed comparative advantages (see Appendix 1, Table 14.3). Some of the products, such as preserved fruits and fresh fish, lost their comparative advantages in 2015 (in the case of fresh and chilled fish, after 2013). In general, China's labor intensive agricultural products have higher comparative advantages than the land intensive ones. As distinguished from Bonnariva (2011) and Ni (2013), the authors have not registered comparative advantage for labor intensive fruits and nuts. After 2011, China also lost comparative advantage in the export of vegetables. However, RCA is high for tea, spices, roots and tubers, and preserved fruit. The switch from being a large exporter to being a large importer of grains—which occurred in China in 1994 (Fang and Beghin 2000)—resulted in the loss of comparative advantage for land intensive wheat, maize, rice, and other cereals.

Analyzing the same set of products using the Vollrath index, the authors identified those export items with a relative trade advantage (RTA > 0) and then applied the RTA results to the previously calculated RCAs. The Vollrath index showed China's relative trade advantage in meat, dried and salted fish, eggs, flour, fruit and vegetable juices, sugar confectionery, and cereal preparations. Gray cells in Table 14.4 (see Appendix 2) represent those product groups where both Balassa and Vollrath indices show comparative advantages: crustaceans and mollusks, fish and aquatic invertebrates, vegetable roots and tubers, tea, and preserved fruit.

Applying the Lafay index to China's export portfolio, the authors concluded that the country has a competitive advantage in labor intensive vegetable roots and tubers, tea, preserved fruit, fish, crustaceans, and

mollusks (see Appendix 3, Table 14.5). Labor intensive crops are better suited for Chinese agriculture (Fang and Beghin 2000). Among the grains, japonica rice is the only crop that exhibits a comparative advantage because it has a higher labor/land ratio than wheat and maize. However, due to high domestic demand, China's rice production should be targeted to maintain the balance between domestic supply and demand (Cheng 2007).

As only four out of 32 commodity groups demonstrated comparative advantages on all three indices, they are considered as positively competitive commodities in China's export portfolio. Other items in China's agricultural export portfolio are either conditionally competitive or conditionally non-competitive. Bearing in mind that most products from the CC and CNC groups are those on which China bases its current self-sufficiency policy, the authors concluded that with such a policy China is going against its comparative advantages.

5 BRI and Differentiation of Policy Measures in Agricultural Exports

China wants its agriculture to stand out in the world. Such an ambitious goal requires a global strategy that coordinates domestic and foreign markets and resources. The BRI is an attempt to increase China's agricultural production and exports, enhance overseas investment, and even reshape international rules on agriculture. In the framework of the BRI, China is interested in promoting its economic influence in the world and exploring new markets for its agricultural commodities and food products. To increase benefits from international trade, both China and its neighbors have to transform economic growth drivers, seize current opportunities, reduce dependence on factors of production (investment and labor), increase reliance on innovation and quality, modernize, and diversify. The major challenge for the sustainable development of trade between China and the countries of Eurasia would be the development and implementation of trade policies that take into account evolving technologies, new financing mechanisms, multistakeholder contributions/partnerships, and cross-border cooperation.

A promising form of collaboration between China and countries involved in the BRI is an international agricultural demonstration zone (ADZ). Approved to be established in ten countries of Southeast Asia and Africa, ADZs will be based on existing projects set up by Chinese firms, which will be given government backing to serve as platforms for other Chinese companies, thus expanding infrastructure and trade links between Chinese agricultural sectors and the world (Asiaone 2017). In addition to ADZs, China should encourage agricultural exports and support companies to set up overseas production bases.

In terms of agricultural exports, policy measures have to be differentiated to support the competitiveness of PC and CC commodity groups and to establish competitive advantages for CNC and NC commodity groups (see Table 14.2). Policy measures for the CC group should be focused on the promotion of domestic products abroad and creating demand for them in the markets of foreign countries. Export-oriented agricultural producers should also benefit from subsidized loans and export insurance programs. Currently, subsidies on agricultural products are provided so as to meet domestic consumption needs, not to promote exports, as the policy does not involve export products in which China has a comparative advantage (Ni 2013).

Indirect economic measures focused on increasing competitiveness and establishing competitive advantage are needed for those products that are conditionally non-competitive, for example, income support or reduction of production costs. Measures to prevent and offset the impact of increases in agricultural imports should be introduced, including anti-dumping measures, countervailing and safeguard measures, and a mechanism to cope with agricultural subsidies in other countries.

Non-competitive products have to be targeted at the domestic market to ensure food security and improve farmers' incomes through a system of agricultural support policies, including direct payments for grain production, subsidies for agricultural inputs, subsidies for farm machinery purchases and improved crop varieties, minimum purchasing prices for wheat and other crops, and temporary storage options. Such measures aimed at supporting CNC and NC products will increase the economic performance of agricultural producers, drive them to expand their production facilities, and thus create conditions for the development of their competitive advantages.

Table 14.2 Grouping of China's export products by competitiveness and differentiation of policy measures

Groups	Export products	Policy measures
PC	1. Fish and aquatic invertebrates 2. Crustaceans, mollusks, and aquatic invertebrates 3. Vegetables, roots, tubers 4. Tea, mate	1. Diminishing of administrative barriers to export 2. Development of production and logistic infrastructure, including access to foreign markets
CC	1. Fruit, preserved 2. Vegetables 3. Fish, fresh, chilled, frozen 4. Fish, dried, salted, smoked 5. Eggs, yolks, albumin 6. Meat, edible meat offal 7. Flour (wheat and meslin) 8. Cereal preparations 9. Fruit and vegetable juices 10. Sugar confectionery 11. Spices	1. PR and promotion of domestic products on foreign markets 2. Support of "niche" export-oriented productions 3. Subsidized loans for the development of export production 4. Subsidized insurance of export-oriented productions
CNC	1. Live animals 2. Meat of bovine animals, fresh, chilled, frozen 3. Rice 4. Maize 5. Cereals, unmilled 6. Fruits and nuts 7. Coffee, coffee substitutes 8. Cocoa 9. Chocolate 10. Margarine 11. Edible products and preparations 12. Other meat and edible meat offal 13. Animal feedstuffs 14. Sugar, molasses, honey	1. Income support of agricultural and food producers 2. Reduction of production costs 3. Programs for sustainable development and diversification of the rural economy 4. Measures to prevent and offset the impact of sharp increases in agricultural imports 5. Investments in agricultural research and infrastructure
NC	1. Milk and dairy products 2. Wheat and meslin 3. Barley	1. Direct payments for grain production 2. Comprehensive subsidies for agricultural inputs 3. Subsidies for farm machinery purchases 4. Subsidies for improved crop varieties 5. Minimum grain purchasing prices 6. Temporary storage options

Source: Authors' development

Table 14.3 Balassa index values for selected agricultural commodity groups in China, 1995–2015

Commodities	1995	2000	2005	2010	2011	2012	2013	2014	2015	RCA_{av}
Live animals	**1.600**	**1.066**	0.325	0.230	0.258	0.233	0.210	0.196	0.206	0.480
Meat of bovine animals	0.072	0.042	0.026	0.031	0.029	0.018	0.009	0.010	0.007	0.027
Other meat and edible meat offal	**1.367**	0.800	0.243	0.144	0.128	0.111	0.107	0.116	0.111	0.347
Meat, edible meat offal	**1.848**	**2.275**	**1.500**	0.855	0.923	0.956	0.830	0.775	0.658	**1.180**
Milk and dairy products	0.059	0.091	0.057	0.015	0.021	0.022	0.014	0.012	0.010	0.033
Eggs, yolks, albumin	0.774	0.576	0.441	0.281	0.325	0.275	0.252	0.247	0.246	0.380
Fish, fresh, chilled, frozen	**1.550**	**1.545**	**1.198**	**1.079**	**1.158**	**1.097**	**1.025**	0.983	0.902	**1.171**
Fish, dried, salted, smoked	**1.625**	**1.017**	0.750	0.675	0.646	0.711	0.693	0.652	0.601	0.819
Crustaceans, mollusks	**2.105**	**1.221**	0.751	**1.006**	**1.043**	**1.071**	**1.115**	**1.105**	**1.014**	**1.159**
Fish and aquatic invertebrates	**3.032**	**3.771**	**2.939**	**2.026**	**2.275**	**2.263**	**2.095**	**1.957**	**1.815**	**2.464**
Wheat and meslin	0.004	0.002	0.028	0.000	0.003	0.000	0.000	0.000	0.000	0.004
Rice	0.074	**2.223**	0.304	0.194	0.170	0.102	0.140	0.117	0.086	0.379
Barley	0.000	0.000	0.004	0.008	0.003	0.002	0.000	0.000	0.000	0.002
Maize	0.041	**3.055**	**1.319**	0.014	0.013	0.025	0.008	0.002	0.001	0.498
Cereals, unmilled	0.884	0.544	0.461	0.316	0.042	0.182	0.141	0.101	0.068	0.304
Flour	0.678	0.644	0.461	0.262	0.022	0.235	0.213	0.155	0.101	0.308
Cereal preparations	0.397	0.230	0.174	0.167	0.192	0.178	0.153	0.145	0.134	0.197
Vegetables	**2.099**	**1.628**	**1.033**	**1.028**	**1.021**	0.882	0.785	0.773	0.760	**1.112**
Vegetables, roots, tubers	**3.747**	**2.634**	**1.837**	**1.710**	**1.887**	**1.583**	**1.667**	**1.562**	**1.576**	**2.022**
Fruits and nuts	0.554	0.323	0.255	0.314	0.322	0.351	0.344	0.317	0.353	0.348
Fruit, preserved	**1.908**	**2.339**	**1.561**	**1.399**	**1.447**	**1.420**	**1.294**	**1.146**	0.973	**1.499**
Fruit and vegetable juices	0.200	4.516	0.786	0.607	0.684	0.684	0.525	0.387	0.338	0.970
Sugar, molasses, honey	0.605	0.444	0.210	0.188	0.184	0.171	0.196	0.209	0.227	0.271
Sugar confectionery	0.706	0.812	0.703	0.704	0.748	0.719	0.714	0.694	0.678	0.720

(*continued*)

Table 14.3 (continued)

Commodities	1995	2000	2005	2010	2011	2012	2013	2014	2015	RCA_{av}
Coffee, coffee substitutes	0.017	0.038	0.043	0.044	0.049	0.063	0.064	0.069	0.085	0.053
Cocoa	0.210	0.111	0.090	0.045	0.055	0.052	0.056	0.051	0.037	0.079
Chocolate	0.038	0.040	0.049	0.054	0.075	0.082	0.087	0.097	0.093	0.068
Tea, mate	**3.880**	**2.927**	**1.640**	**1.085**	**1.202**	**1.211**	**1.251**	**1.246**	**1.226**	**1.741**
Spices	**3.318**	**1.469**	**1.901**	**1.242**	0.998	0.765	0.823	0.785	0.597	**1.322**
Animal feedstuffs	0.577	0.377	0.220	0.323	0.291	0.349	0.280	0.306	0.259	0.331
Margarine	0.020	0.255	0.094	0.029	0.025	0.032	0.031	0.030	0.030	0.061
Edible products and preparations	0.557	0.867	0.473	0.392	0.419	0.408	0.378	0.353	0.359	0.467

Source: Authors' calculation

Table 14.4 Vollrath index values for selected agricultural commodity groups in China, 1995–2015

Commodities	1995	2000	2005	2010	2011	2012	2013	2014	2015	RTA_{av}
Live animals	***1.462***	***0.907***	**0.192**	**0.073**	**0.065**	0.000	**0.021**	−0.143	−0.056	**0.280**
Meat of bovine animals	**0.062**	**0.028**	**0.019**	**0.002**	**0.002**	−0.052	−0.298	−0.275	−0.543	−0.117
Other meat and edible meat offal	***1.221***	**0.029**	−0.002	−0.269	−0.370	−0.452	−0.521	−0.479	−0.582	−0.158
Meat, edible meat offal	***1.835***	***2.239***	***1.494***	**0.850**	**0.919**	**0.951**	**0.826**	**0.773**	**0.653**	***1.171***
Milk and dairy products	−0.077	−0.304	−0.229	−0.541	−0.539	−0.664	−0.923	−1.029	−0.660	−0.552
Eggs, yolks, albumin	**0.719**	**0.556**	**0.434**	**0.274**	**0.321**	**0.273**	**0.251**	**0.246**	**0.246**	**0.369**
Fish, fresh, chilled, frozen	***0.888***	***0.651***	***0.236***	***0.399***	***0.482***	***0.493***	***0.459***	**0.388**	**0.312**	***0.479***
Fish, dried, salted, smoked	***1.302***	***0.586***	**0.612**	**0.643**	**0.619**	**0.683**	**0.664**	**0.630**	**0.567**	**0.701**
Crustaceans, mollusks	***1.710***	***0.629***	**0.364**	***0.594***	***0.523***	***0.456***	***0.438***	***0.449***	***0.213***	***0.597***
Fish and aquatic invertebrates	***2.990***	***3.757***	***2.911***	***1.974***	***2.198***	***2.191***	***2.023***	***1.865***	***1.715***	***2.403***
Wheat and meslin	−4.334	−0.290	−0.602	−0.096	−0.083	−0.225	−0.356	−0.189	−0.212	−0.710
Rice	−2.344	***1.767***	**0.001**	**0.068**	**0.002**	−0.366	−0.303	−0.380	−0.573	−0.236
Barley	−2.817	−3.007	−1.738	−1.039	−0.839	−0.962	−0.821	−1.843	−3.385	−1.828
Maize	−2.567	***3.055***	***1.317***	−0.145	−0.154	−0.419	−0.231	−0.192	−0.351	0.035
Cereals, unmilled	−0.477	**0.544**	**0.416**	**0.181**	−0.015	0.035	−0.748	−3.170	−5.039	−0.919
Flour	**0.533**	**0.413**	**0.392**	**0.244**	**0.012**	**0.223**	**0.189**	**0.128**	**0.074**	**0.245**
Cereal preparations	**0.334**	**0.187**	**0.137**	**0.104**	**0.117**	**0.091**	**0.051**	**0.027**	−0.042	**0.112**
Vegetables	***1.962***	***1.505***	***0.786***	***0.725***	***0.700***	**0.470**	**0.407**	**0.384**	**0.350**	***0.810***
Vegetables, roots, tubers	***3.706***	***2.510***	***1.773***	***1.654***	***1.822***	***1.501***	***1.586***	***1.477***	***1.477***	***1.945***
Fruits and nuts	**0.450**	−0.017	**0.065**	**0.030**	−0.020	−0.053	−0.035	−0.133	−0.189	**0.011**
Fruit, preserved	***1.877***	***2.293***	***1.458***	***1.206***	***1.259***	***1.233***	***1.130***	***0.959***	**0.711**	***1.347***
Fruit and vegetable juices	**0.164**	**4.457**	**0.664**	**0.477**	**0.548**	**0.557**	**0.397**	**0.243**	**0.204**	**0.857**
Sugar, molasses, honey	−1.578	**0.093**	−0.117	−0.086	−0.253	−0.368	−0.314	−0.205	−0.355	−0.354
Sugar confectionery	**0.431**	**0.606**	**0.625**	**0.629**	**0.663**	**0.615**	**0.611**	**0.580**	**0.497**	**0.584**
Coffee, coffee substitutes	**0.004**	**0.021**	**0.017**	**0.006**	**0.007**	**0.005**	**0.004**	−0.019	−0.035	**0.001**
Cocoa	−0.122	−0.121	−0.092	−0.113	−0.123	−0.145	−0.142	−0.123	−0.139	−0.125

(*continued*)

Table 14.4 (continued)

Commodities	1995	2000	2005	2010	2011	2012	2013	2014	2015	RTA_{av}
Chocolate	−0.021	−0.106	−0.034	−0.035	−0.029	−0.036	−0.045	−0.064	−0.105	−0.053
Tea, mate	***3.852***	***2.886***	***1.605***	***0.995***	***1.112***	***1.116***	***1.158***	***1.131***	***1.073***	***1.659***
Spices	***3.169***	***1.347***	***1.845***	***1.183***	**0.942**	**0.678**	**0.777**	**0.722**	**0.536**	***1.244***
Animal feedstuffs	−0.149	−0.801	−0.404	−0.260	−0.180	−0.069	−0.165	−0.166	−0.365	−0.284
Margarine	−0.177	−1.717	−0.060	−0.144	−0.528	−0.622	−0.421	−0.553	−0.532	−0.528
Edible products and preparations	**0.382**	**0.556**	**0.251**	**0.064**	**0.089**	**0.035**	−0.036	−0.076	−0.261	**0.111**

Source: Authors' calculation

Table 14.5 Lafay index values for selected agricultural commodity groups in China, 1995–2015

Commodities	1995	2000	2005	2010	2011	2012	2013	2014	2015	LI_{av}
Live animals	***0.591***	***0.257***	**0.082**	**0.023**	**0.021**	**0.002**	**0.009**	−0.036	−0.011	**0.104**
Meat of bovine animals	**0.038**	**0.001**	**0.002**	**0.002**	**0.002**	−0.023	−0.137	−0.130	−0.236	−0.053
Other meat and edible meat offal	***1.137***	**0.005**	**0.002**	−0.246	−0.339	−0.382	−0.427	−0.378	−0.382	−0.112
Meat, edible meat offal	***0.416***	***0.722***	***0.894***	**0.227**	**0.240**	**0.238**	**0.203**	**0.182**	**0.133**	***0.362***
Milk and dairy products	−0.046	−0.266	−0.283	−0.308	−0.314	−0.348	−0.526	−0.595	−0.267	−0.328
Eggs, yolks, albumin	**0.041**	**0.005**	**0.016**	**0.022**	**0.022**	**0.020**	**0.018**	**0.017**	**0.015**	**0.020**
Fish, fresh, chilled, frozen	***0.599***	***0.676***	***0.281***	***0.311***	***0.362***	***0.343***	***0.323***	**0.274**	**0.200**	***0.374***
Fish, dried, salted, smoked	***0.136***	***0.097***	**0.129**	**0.052**	**0.049**	**0.048**	**0.045**	**0.042**	**0.034**	**0.070**
Crustaceans, mollusks	***1.046***	***0.608***	**0.379**	***0.249***	***0.221***	***0.179***	***0.197***	***0.226***	***0.126***	***0.359***
Fish and aquatic invertebrates	***0.995***	***2.052***	***2.375***	***0.672***	***0.746***	***0.733***	***0.659***	***0.568***	***0.452***	***1.028***
Wheat and meslin	−2.920	−0.242	−0.637	−0.055	−0.056	−0.138	−0.208	−0.100	−0.091	−0.494
Rice	−0.606	***0.650***	−0.001	**0.020**	**0.001**	−0.111	−0.076	−0.095	−0.132	−0.039
Barley	−0.348	−0.515	−0.373	−0.094	−0.085	−0.097	−0.089	−0.164	−0.295	−0.229
Maize	−1.161	***1.566***	***0.828***	−0.060	−0.075	−0.200	−0.101	−0.075	−0.114	**0.067**
Cereals, unmilled	−0.036	**0.045**	**0.036**	**0.007**	−0.001	0.001	−0.039	−0.170	−0.308	−0.052
Flour	**0.056**	**0.042**	**0.055**	**0.017**	**0.001**	**0.016**	**0.013**	**0.008**	**0.004**	**0.024**
Cereal preparations	**0.159**	**0.151**	**0.193**	**0.065**	**0.070**	**0.052**	**0.029**	**0.016**	−0.021	**0.079**
Vegetables	***1.579***	***1.726***	***1.469***	***0.668***	***0.577***	**0.326**	**0.299**	**0.273**	**0.238**	***0.795***
Vegetables, roots, tubers	***1.522***	***1.447***	***1.592***	***0.679***	***0.714***	***0.518***	***0.576***	***0.527***	***0.477***	***0.895***
Fruits and nuts	**0.449**	−0.086	**0.137**	**0.013**	−0.045	−0.081	−0.067	−0.174	−0.230	−0.010
Fruit, preserved	***0.427***	***0.768***	***0.812***	***0.299***	***0.317***	***0.298***	***0.269***	***0.223***	**0.164**	***0.397***
Fruit and vegetable juices	**0.036**	**1.681**	**0.333**	**0.106**	**0.126**	**0.118**	**0.077**	**0.041**	**0.031**	**0.283**
Sugar, molasses, honey	−0.943	**0.020**	−0.158	−0.060	−0.177	−0.216	−0.162	−0.096	−0.127	−0.213
Sugar confectionery	**0.077**	**0.159**	**0.231**	**0.096**	**0.094**	**0.083**	**0.085**	**0.081**	**0.062**	**0.108**

(*continued*)

Table 14.5 (continued)

Commodities	1995	2000	2005	2010	2011	2012	2013	2014	2015	LI_{av}
Coffee, coffee substitutes	**0.002**	**0.014**	**0.014**	**0.003**	**0.004**	**0.003**	**0.002**	−0.007	−0.013	**0.002**
Cocoa	−0.027	−0.034	−0.051	−0.034	−0.036	−0.031	−0.029	−0.028	−0.029	−0.033
Chocolate	−0.004	−0.039	−0.021	−0.010	−0.008	−0.010	−0.013	−0.019	−0.028	−0.017
Tea, mate	***0.354***	***0.516***	***0.371***	***0.119***	***0.122***	***0.115***	***0.123***	***0.110***	***0.101***	***0.214***
Spices	***0.229***	***0.207***	***0.306***	***0.115***	**0.107**	**0.066**	**0.073**	**0.077**	**0.064**	***0.138***
Animal feedstuffs	−0.158	−1.046	−0.763	−0.274	−0.181	−0.075	−0.170	−0.170	−0.309	−0.350
Margarine	−0.009	−0.159	−0.007	−0.011	−0.043	−0.046	−0.028	−0.035	−0.028	−0.041
Edible products and preparations	**0.263**	**0.565**	**0.446**	**0.044**	**0.050**	**0.020**	−0.037	−0.057	−0.197	**0.122**

Source: Authors' calculation

6 Conclusions

The aim of the study was to develop an approach to the identification of competitive and non-competitive products in China's export portfolio to differentiate BRI policy measures aimed at the support, promotion, development, or establishment of a competitive advantage. The authors employed a five-step process of analysis to: (1) reveal comparative advantages of a country in exports; (2) discover competitive advantages in both exports and imports; (3) weight each product's contribution to an export portfolio; (4) divide products into groups depending on their competitiveness; and (5) differentiate policy measures aimed at developing domestic agricultural production and diversifying exports as a comparative advantage of China in terms of the expansion of the BRI.

In the case of China's agricultural exports, the above-described methodology identified comparative advantages of the country in the export of labor intensive agricultural products. Further comparison between the revealed comparative advantages and competitive advantages with the implementation of Vollrath and Lafay indices showed that China did not have comparative advantages in those agricultural commodities on which the country bases its current self-sufficiency policy.

A set of policy measures have been constructed in such a way that competitive and conditionally competitive export products have to be supported to implement or develop competitive advantage and thus expand exports; while conditionally non-competitive and non-competitive products should be reoriented to the domestic market. Implementation of those measures may expand the export of China's labor intensive agricultural products in the PC group, facilitate the concentration of resources toward potentially competitive products that are CC, promote the competitive advantage of CNC and NC products, and thus increase the overall productivity of China's agriculture and ensure the sustainable export growth of China's agricultural products to the BRI countries.

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Appendix 1

Appendix 2

Appendix 3

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