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A Comparison on Rice export between China and Vietnam: A constant market share analysis

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Rice exports are assumed to be one of the engines of economic growth of both Vietnam and China in recent years. The present study aimed to compare the rice export performance of Vietnam and China and assesses to what extent it reflects their international competitiveness in the selected target markets over 2000-2014 period. The Constant Market Share model was applied to identify the main decompositions affecting the changes of its export growth. The results of decomposition analysis underlined that the structural effect and growth effect have been more significant in affecting the export growth of these two parties; and their export orientation to target markets was remaining stable during the studied periods. In which, China rice exports have been suffered a highly intense competitiveness from Vietnam exports in Philippine, Singapore, Africa and Middle East market. Further, the competitiveness index indicated that China export growth (to the target markets) was stronger than that of Vietnam in the first sub-period (2000-2008), but the case had changed in the second sub-period (2008-2014). Specifically, China rice export volume to Vietnam was stronger than that of Vietnam to China.

Keywords: China, decomposition, rice export, target markets, Vietnam

INTRODUCTION

Rice is a staple food for nearly half of the world population, which more than 90% of the world rice is consumed in Asia (Childs and Kiawu, 2009). Rice export is mainly concentrated in some countries, including Thailand, Vietnam, Pakistan, USA, India, China, Brazil, Italy, Uruguay, UAE, Benin, and Argentina, which account for more than 90% of the global rice traded (Muthayya et al., 2014). Among these, Vietnam and China are traditionally agricultural countries and rice is an export-oriented commodity and significantly contributes to the sustainable economy development of both Vietnam and China. During the recent years, Vietnam and China rice exports have expanded significantly and being regularly on the top rice exporting countries in the world thanks to natural resources endowment and the

development policies of two Governments. In light of these advantages, the aggregated export share from these two countries accounted for 17.9% (2009), 18.4% (2010), 17.2% (2011), and 15.9% (2012) of the world total rice exports (<https://comtrade.un.org/>).

Vietnam is among the most important rice producers in the world thanks to its diversified geography and land conditions, which has made a huge contribution to the world's food security objectives. Rice production in Vietnam plays a crucial role in stabilising the national macro-economy which has generated jobs for over 60% of the country's labour force and brought a main source of export earnings (<http://www.vietrade.gov.vn/>). Since the declaration of the International Year of Rice in 2004, a special event of rice production in the world, Vietnam's rice turnover has increased three-fold, yielding US\$3.6 billion in 2012 and US\$2.9 billion in 2013, contributed to 14.8% and 11.4% of the world share, respectively (<https://comtrade.un.org/>). The reasons behind Vietnam's ability to obtain its current rice export levels would

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depend on renewed investments in research, access of scientific technology and the rehabilitation and expansion of rice infrastructure (Pingali et al., 1997). Especially, the releasing of 1980s economic reforms in Vietnam's agriculture sector have been widely recognised as the underlying factors behind the boost in rice production and exports in the 1990s (Pingali and Xuan, 1992). Ever since, Vietnam shifted rapidly from being a net rice importer in 1968 to become the third largest world rice exporter since it has exported 1.4 million tons of rice in 1989 (Pingali et al., 1997). Rice surplus for the urban and export markets mostly originated from the Mekong River Delta and Red River Delta regions, which recorded at over 90% of all rice production of the country while more than 90% of exported rice comes from the Mekong River Delta regions (Kompas et al., 2010).

China is by far the largest rice producing country; in which nearly one-third of the world rice was produced and consumed in China (Wailes, 2005). Being the main contributor to the world rice production, the global trend of human food security would depend much on the China rice production. Further, it was estimated that rice has been the only agricultural product of China with certain international competitiveness among cereals in the international markets (Yang, 2009). Albeit trade has been accounting for a relatively small share of China's rice market, the stable quantities and the direction of China trade had major implications for the world markets due to its market vast size (USITC, 2015). The large target markets of China rice export include South Korea, North Korea, Japan, Hong Kong, and Cote d'Ivoire. Since WTO accession in 2001, China rice has been undergone intense competition from other countries such as Thailand, India, Vietnam and Pakistan. Then the competitive advantage of China rice in international markets has been inevitably weakened by the years (Fuller et al., 2001). Between 2007 and 2013, China's rice exports has gradually decreased, falling from 1.3 million mt in 2007 to 279,000 mt in 2012 before rising to 478,000 mt in 2013 (USITC, 2015).

LITERATURE REVIEW

The normalisation of China-Vietnam relation in 1991 has become a significant force in shaping the economic prospects and generating bilateral trade opportunities of two countries (Womack, 1994). Along with the improvement in the economy relation, in the available literature, there were relatively little published researches on the comparative analysis on rice trade competitiveness between Vietnam and China. Nga (2009) proposed a study on rice trade comparison between Vietnam and China, their market share on the third markets was taken into accounts to evaluate the trade competitiveness between these two countries. Consequently, Pai (2014) had examined the trade

competitiveness, the market share and revealed comparative advantage index to investigate the trilateral competitiveness comparison of rice export among China, Vietnam and Thailand.

The Constant Market Share (CMS) model was first postulated by Tyszynski (1951) which was applied to assess the export performance of a particular country in international economics. CMS model decomposes the variation of the market share of an exporter into a number of components and identifies the contribution of each component to the changes in export growth (Bonanno, 2016). The analysis theoretically bases on the assumption that a country's export shares in world markets should remain constant overtime. The CMS methodology has been applied extensively in many previous studies in order to shed light on the factors underlying a country's export performance (Ahmadi-Esfahani, 1993; Amador and Cabral, 2008; Atis et al., 2013; Mahmood, 2015; Thomas and Sheikh, 2012). According to this model analysis, a country's market share in the world exports in a given period is mainly determined by four components; namely, market share effect, commodity composition effect, market distribution effect and competitiveness effect (Milana, 1988; Richardson, 1971). This approach has been formulated in different versions to calculate the trade growth factors of a particular country (Mensah, 2010; Sari, 2010; Singh, 2014; Skriner, 2009; Wizarat and Ahmed, 2015; Xiao et al., 2015) or at the product level, i.e. both manufactured and agricultural products (Bojnec and Fertő, 2014; Chen and Duan, 1999; Coutinho and Fontoura, 2012; El-Sawalhy et al., 2008; Pandiella, 2015). Though the original version of CMS model was popularly accepted, it still exists some limitations both with respect to the procedure of accounting and the interpretation of the residual components (Mushtaq and Halil, 2005). The most decisive improvement to the solution of these problems was then proposed by Jepma (1986) decomposition which presents a series of new components that help to explain effectively the variation in export performance and generates the reliability of the results.

On the fact that both Vietnam and China were recorded as the main rice exporters, the scenario of trade competitiveness in rice export to world markets between Vietnam and China is consequently existed. Thus, understanding the export status and market share competitiveness of Vietnam and China rice export is necessary to provide statistical significance for trade policy formulation to promote Vietnam and China rice exports to the world markets in the future. To investigate this issue, the CMS model was firstly applied to investigate the changes in rice export growth of these two parties and their mutual competitiveness in target markets. This is also the motivation behind this study.

METHODS

Data collection

The time-series secondary data used in this study were acquired from the United Nations Commodity Trade Statistics Database (<http://comtrade.un.org>) as the most complete source of data by using Standard International Trade Classification three digit data (SITC Rev.3) over the 2000-2014 period. Then, the observed period was divided further into two sub-periods: 2000-2008 and 2008-2014. The selection of target markets of China and Vietnam was adopted basing on their constitution of over 90% of their rice importing volume from Vietnam and China export over the studied period which can theoretically give a practical result to the study.

Total 13 main and consistent rice importing partners of both China and Vietnam, namely Philippine, Indonesia, Malaysia, Hong Kong, Singapore, Russia, Cote d'Ivoire, USA, Vietnam or China (Vietnam and China were mutual target market of each other), Africa16 (Ghana, Senegal, Guinea, Nigeria, Liberia, Angola, Algeria, Ethiopia, Libya, Madagascar, Mozambique, Tanzania, Guinea Bissau, Kenya, Cameroon and South Africa), Middle East12 (Egypt, Iran, Iraq, Israel, Lebanon, Qatar, Saudi Arabia, Syria, Turkey, UAE, Yemen and Jordan), Asia10 (Bangladesh, Timor-Leste, Kazakhstan, Kyrgyzstan, Mongolia, Myanmar, North Korea, South Korea, Tajikistan and Uzbekistan) and Europe10 (United Kingdom, Poland, Switzerland, Ukraine, Belgium, Hungary, Bulgaria, Germany, Croatia and Romania), were chosen for this study.

The data of selected target markets used to describe the contributions and the variations of each target market with their rice import value from China and Vietnam over the sample period were computed and presented in Table 1 and Table 2. Table 1 showed the descriptive statistics of China, as we can see; China rice export in terms of value showed more variability in Malaysia, Indonesia, Middle East, USA, Europe and Singapore market than other markets. On the other hand, the descriptive statistic of Vietnam rice export in Table 2 indicated that China's rice import volume from Vietnam showed most fluctuated, followed by Indonesia, Hong Kong, Asia and USA market as compared with other markets. That was to say, China and Vietnam rice exports both have sustainable market share on these target markets over the sample period.

Data analysis

Based on the actual situation of this study, a modified CMS model with two-level decomposition, suggested by Jepma (1986) was adopted to describe and compare Vietnam and China's rice export performance in selected target markets. The CMS decomposition used in this

study have been specified in Equation 1.

The first level decomposition:

$$\Delta q = \sum_i \sum_j s_{ij}^0 \Delta Q_{ij} + \sum_i \sum_j Q_{ij}^0 \Delta s_{ij} + \sum_i \sum_j \Delta s_{ij} \Delta Q_{ij}$$

Structural effect Competitive effect Second-order effect

The second level decomposition:

$$\Delta q = s^0 \Delta Q + \left(\sum_i \sum_j s_{ij}^0 \Delta Q_{ij} - \sum_i s_i^0 \Delta Q_i \right) + \Delta s Q^0 +$$

$$\left(\sum_i \sum_j \Delta s_{ij} Q_{ij}^0 - \Delta s Q^0 \right) + (Q^1/Q^0 - 1) \sum_i \sum_j \Delta s_{ij} Q_{ij}^0 +$$

Specific competitive effect Pure second-order effect

$$\left[\sum_i \sum_j \Delta s_{ij} \Delta Q_{ij} - (Q^1/Q^0 - 1) \sum_i \sum_j \Delta s_{ij} Q_{ij}^0 \right]$$

Dynamic structural effect

Where:

q: the total rice export value of China (Vietnam) to the world markets;

s: China (Vietnam)'s market share of rice export in target markets;

Q: total rice import value of target markets from the world markets;

Δ : indicates the changes in two sub-periods; superscript 0 indicates the initial year; 1 indicates the terminal year;

subscript i represents rice commodity; and j represents target markets (here, Philippine, Indonesia, Malaysia, Hong Kong, Singapore, Russia, Cote d'Ivoire, USA, Vietnam (China), Africa, Middle East, Asia and Europe).

According to the theory of CMS analysis, the interpretations of CMS decomposition were illustrated as followings in Table 3.

RESULTS AND DISCUSSION

The CMS Decomposition Analysis on the Changes of China and Vietnam Rice Export Growth to Target Markets over 2000-2008 periods

The results of CMS decomposition analysis of China and Vietnam to thirteen target markets over 2000-2008 periods were summed in Table 4 and Table 5, respectively. As shown in Table 4 and Table 5, at the first level decomposition, most of target markets experienced a large fall in the import value from China but increasing the import value from Vietnam (except Middle East) during the studied period. The structural effect described the expected change in exports respect to its market share in the importer's market (Ahmadi-Esfahani, 1993). As estimated results, most of the structural effect values were positively significant, suggested the strong impact on increasing the rice export growth of Vietnam and

Table 1. Descriptive statistics on export value (US\$000) of China rice exports in selected target markets over 2000-2014 periods

Countries/Regions	Mean	Std. dev.	CV	Min	Max
Philippine	3558.5	3178.31	89.32	0.36	10473.99
Indonesia	14110	24563.81	174.09	0.3	92687.2
Malaysia	2494.5	6191.26	248.20	0.07	22359.46
Hong Kong	14756	9222.27	62.50	4065.45	29596.84
Singapore	283.35	312.90	110.43	0.00	888.85
Russia	24830	22201.27	89.41	2700.7	63144.04
Cote d'Ivoire	66132	51990.02	78.62	1910	147000
USA	11871	17278.40	145.55	140.85	52002.54
Vietnam	16667	8384.83	50.31	4765.83	32080.08
Africa	40654	31788.66	78.19	728.27	104000
Middle East	8623.4	13240.41	153.54	188.9	50747.04
Asia	132380	90500.22	68.36	42151.47	302000
Europe	5030.2	6601.09	131.23	90	22329.26

Note: The data of China does not include the data from Hong Kong, Macao and Taiwan

Table 2. Descriptive statistics on export value (US\$000) of Vietnam rice exports in selected target markets over 2000-2014 periods

Countries/Regions	Mean	Std. dev.	CV	Min	Max
Philippine	447650	344773	77.018	85365.25	1180000
Indonesia	204400	265276	129.783	7214.26	1020000
Malaysia	171870	106893	62.194	36671.33	403000
Hong Kong	37101	45635.25	123.003	290.46	121000
Singapore	79519	72681.30	91.401	10509.02	228000
Russia	24489	11528.38	47.076	7465.97	41714.67
Cote d'Ivoire	86853	72555.46	83.538	704.95	229000
USA	10887	11719.60	107.648	37.8	35653.8
China	199180	364728	183.115	279.13	904000
Africa	272930	171064	62.677	40010.82	530000
Middle East	103660	69543.00	67.088	19250.47	279000
Asia	50652	62593.24	123.575	3208.49	201000
Europe	21648	12338.84	56.998	6349.92	50820.03

Note: The data of China does not include the data from Hong Kong, Macao and Taiwan

Table 3. Interpretations for the two-level CMS decomposition items

Decomposition items	Interpretation
Change in export value	The changes in export value of the exporting country in two periods.
<i>The first level decompositions</i>	
Structural effect	The changes in exports due to the change in the structure and the size of the recipient country's demand, given that the exporting country still maintained its market shares in the recipient country's market.
Competitive effect	The changes in exports due to the change of exporting country's competitiveness. It shows the capacity of the exporting country in maintaining its export's shares of that commodity in recipient country's market. A positive value indicates the strong competitiveness of the exporting country in recipient country's market. A negative value means otherwise.
Second-order effect	The changes in exports due to the interaction of the changes in the exporting country's export structure with the changes in the size and structure of recipient country's imports.

Table 3 Cont.

<i>The second level decompositions</i>	
Growth effect	The changes in exports of the exporting country due to the general increase of recipient country's imports, given that the exporting country's market share in recipient country is constant.
Market effect	The changes in exports due to the market distribution effect, the positive/negative value of this effect measures the extent of concentration in export that the exporting country would have on the recipient country's market.
General competitive effect	The changes in exports due to the changes of exporting country's export share, given that the demand of recipient country is constant.
Specific competitive effect	The changes in exports due to the changes of exporting country's export share with that kind of commodity in recipient country's market. A positive value indicates that the change in specific competitiveness of that commodity of the exporting country has a favourable influence on its export performance. A negative indicates otherwise.
Pure second-order effect	Measuring the impact of changes of exporting country's export share with the changes of recipient country's imports. Positive value indicates that the changes of exporting country's export structure are corresponding with the changes in the size of recipient country and vice versa.
Dynamic structural effect	The changes in exports due to the interaction of the exporting country's market share with the changes in the structure of recipient country's demand. The positive effect indicates that the exporting country has a rapid growing export share with recipient country's demand. Negative indicates otherwise.

Table 4. The results of CMS decomposition of the changes in export value of China over 2000-2008 periods

Country	Change in export value	First-level decomposition					Second-level decomposition				
		Structural effect	Competitive effect	Second order effect	Growth effect	Market effect	General competitive effect	Specific competitive effect	Pure second-order effect	Dynamic structural effect	
Philippine	1.467	1.068	0.291	0.108	274.441	-273.373	-152.275	152.566	0.200	-0.092	
%	100	73	20	7	18709	-18636	-10381	10401	14	-6	
Indonesia	-11.490	-8.637	-5.336	2.482	582.931	-591.568	-229.787	224.451	-7.795	10.278	
%	100	75	46	-22	-5073	5148	2000	-1953	68	-89	
Malaysia	-3.842	-3.726	-3.085	2.970	508.344	-512.071	-215.877	212.792	-3.931	6.901	
%	100	97	80	-77	-13232	13329	5619	-5539	102	-180	
Hong Kong	15.165	14.980	0.068	0.117	325.497	-310.518	-169.662	169.730	0.056	0.062	
%	100	99	0	1	2146	-2048	-1119	1119	0	0	
Singapore	-0.369	0.119	-0.387	-0.101	376.184	-376.066	-184.657	184.271	-0.364	0.264	
%	100	-32	105	27	-102008	101976	50073	-49968	99	-71	
Russia	-29.547	-24.920	-14.218	9.592	208.146	-233.066	-125.335	111.117	-7.417	17.009	
%	100	84	48	-32	-704	789	424	-376	25	-58	
Cote d'Ivoire	-54.771	-60.441	20.070	-14.401	513.430	-573.871	-216.898	236.968	25.827	-40.227	
%	100	110	-37	26	-937	1048	396	-433	-47	73	

Table 4 Cont.

USA	-10.251	-7.942	-5.147	2.837	502.173	-510.115	-214.623	209.476	-6.478	9.315
%	100	77	50	-28	-4899	4976	2094	-2043	63	-91
Vietnam	12.824	10.218	1.335	1.271	487.830	-477.612	-211.641	212.976	1.632	-0.360
%	100	80	10	10	3804	-3724	-1650	1661	13	-3
Africa	-9.975	20.180	-21.337	-8.818	472.034	-451.854	-208.244	186.907	-25.242	16.424
%	100	-202	214	88	-4732	4530	2088	-1874	253	-165
Middle East	-8.411	-1.487	-7.877	0.953	471.253	-472.740	-208.072	200.195	-9.304	10.257
%	100	18	94	-11	-5603	5620	2474	-2380	111	-122
Asia	138.367	139.217	-0.287	-0.562	404.542	-265.325	-192.222	191.934	-0.291	-0.271
%	100.0	100.6	-0.2	-0.4	292.4	-191.8	-138.9	138.7	-0.2	-0.2
Europe	-4.270	-3.564	-1.632	0.926	281.874	-285.438	-154.969	153.337	-1.153	2.079
%	100	83	38	-22	-6601	6685	3629	-3591	27	-49

Note: The data of China does not include the data from Hong Kong, Macao and Taiwan

Table 5. The results of CMS decomposition of the change in export value of Vietnam over 2000-2008 periods

Country	Change in export value	First-level decomposition					Second-level decomposition				
		Structural effect	Competitive effect	Second order effect	Growth effect	Market effect	General competitive effect	Specific competitive effect	Pure second-order effect	Dynamic structural effect	
Philippine	347.137	281.625	35.9	29.612	822.199	-540.573	667.72	-631.82	24.693	4.919	
%	100	81	10	9	237	-156	192	-182	7	1	
Indonesia	190.754	250.431	-18.253	-41.425	1746.404	-1495.97	82.402	-100.655	-26.667	-14.758	
%	100	131	-10	-22	916	-784	43	-53	-14	-8	
Malaysia	156.83	282.448	-35.089	-90.529	1522.95	-1240.5	187.438	-222.527	-44.705	-45.824	
%	100	180	-22	-58	971	-791	120	-142	-29	-29	
Hong Kong	64.764	618.051	-5.826	-547.46	975.159	-357.108	536.426	-542.252	-4.753	-542.707	
%	100	954	-9	-845	1506	-551	828	-837	-7	-838	
Singapore	113.484	46.975	24.545	41.964	1127.012	-1080.04	423.189	-398.644	23.142	18.822	
%	100	41	22	37	993	-952	373	-351	20	17	
Russia	3.01	15.685	-7.621	-5.054	623.584	-607.899	871.154	-878.775	-3.976	-1.078	
%	100	521	-253	-168	20720	-20199	28946	-29199	-132	-36	
Cote d'Ivoire	108.254	76.302	10.154	21.797	1538.188	-1461.89	179.73	-169.576	13.066	8.731	
%	100	70	9	20	1421	-1350	166	-157	12	8	
USA	15.993	419.619	-3.589	-400.037	1504.461	-1084.84	196.908	-200.497	-4.518	-395.52	
%	100	2624	-22	-2501	9407	-6783	1231	-1254	-28	-2473	

Table 5 Cont.

China	410.62	474.803	-0.956	-63.228	3270.9	-2796.1	-353.742	352.786	-2.615	-60.612
%	100	116	0	-15	797	-681	-86	86	-1	-15
Africa	258.85	175.253	41.011	42.587	1414.169	-1238.92	245.082	-204.071	48.518	-5.931
%	100	68	16	16	546	-479	95	-79	19	-2
Middle East	-38.302	68.915	-68.685	-38.532	1411.829	-1342.91	246.375	-315.059	-81.123	42.591
%	100	-180	179	101	-3686	3506	-643	823	212	-111
Asia	83.663	173.69	-7.013	-83.013	1211.968	-1038.28	366.07	-373.083	-7.111	-75.903
%	100	208	-8	-99	1449	-1241	438	-446	-8	-91
Europe	1.602	16.517	-8.425	-6.49	844.469	-827.952	647.38	-655.805	-5.952	-0.538
%	100	1031	-526	-405	52718	-51687	40414	-40940	-372	-34

Note: The data of China does not include the data from Hong Kong, Macao and Taiwan

China to target markets. This result was consistent with findings of many previous researches, which stated that the export change of exporters to its target markets was mainly dominated by the structural effects (Chen and Duan, 1999; Hu, 2013; Mensah, 2010; Mushtaq and Halil, 2005; Qi, 2009). In which, China had the significant structural effects on the 11 over total 13 target markets (except Singapore and Africa), ranged from 18% (Middle East) to 110% (Cote d'Ivoire). Also, the structural effects of Vietnam were almost positive, except Middle East market (-180%). Specifically, the structural effect values of Vietnam on Philippines, Indonesia, Malaysia, Hong Kong, USA, Russia, Asia and Europe market were found to have more significance over China. The above results clearly tell us that the structure of Vietnam rice exports to all target markets in this period was stronger than that of China, and the structural effect of Vietnam's export to China (116%) was stronger than that of China export to Vietnam (80%).

The competitive effect, being dominated by market forces (i.e., supply and demand), was the main factor to enhance China export competitiveness to Philippines, Indonesia,

Malaysia, Singapore, Russia, USA, Vietnam, Africa, Middle East and Europe but the negative competitive effect of China from Cote d'Ivoire and Asia market caused the decline competitiveness to these two markets. Furthermore, it can be seen that, both Vietnam and China were competitive in Philippines, Singapore, Africa and Middle East but not competitive in Asia market. Obviously, the competitiveness of China's rice exports to target markets was stronger than that of Vietnam over 2000-2008 period and the competitiveness of China's rice exports to Vietnam (10%) was significantly higher than that of Vietnam's rice exports to China (0%).

Regardless of positive or negative values, the second order effect of both Vietnam and China in the target markets was not obvious. This implies that the real export growth of Vietnam and China has relatively small impact and it still remained stable with the changes in the level and the structures of the target market's demand.

At the second level decomposition, the growth effect values contributed positively to the increase in exports of exporting country. In terms of percentage, the changes in the growth effect of Vietnam export were positive for all importers

except Middle East, ranged from 237 % (Philippine) to 52718 % (Europe) while the contributions of the growth effect to the increase of China exports were almost negative. Apparently, Vietnam had a strong growth effect comparing with China in this period. Besides, market effect describes the changes in the expected exports if an exporter attains its market share in the target markets. Most of the market effect values of both Vietnam and China appeared insignificant over the investigated period. The negative market effects of exporters (China and Vietnam) were indicative of a fall in its export share in the target markets. Additionally, further decomposition of the general and specific competitive effect revealed that Vietnam and China were strong in its general competitiveness, but weak in its specific competitiveness. This suggested that both Vietnam and China had more competitiveness in its total rice exports due to the demand of target markets. Overall, in this period, the dominant factors that decided the export growth of Vietnam and China were the structural effect and growth effect. Further, Vietnam and China both have intense competition in Philippine, Singapore, Africa and Middle East market.

The CMS Decomposition Analysis on the Changes of China and Vietnam Rice Export Growth to Target Markets over 2008-2014 periods

The results of CMS decomposition of China and Vietnam to target markets during 2008-2014 periods were provided in Table 6 and Table 7, respectively. When all the target markets were considered together, it was seen that the changes in export value of China and Vietnam to the target markets were almost negative, implied that the rice purchasing power of these importers was declined also. This finding was compatible with the global trend that the sharp increase in rice prices in 2007 and early 2008 had a detrimental impact on consumer's buying. As a result, for many of these target markets, they would have reduced a large purchase of rice due to this food riots (Childs and Kiawu, 2009).

The first level CMS decomposition results revealed that the rising in rice export value of China and Vietnam to the target markets was mainly attributed to the structural effect. In terms of percentage, the contribution of structural effect to the increase of China export was virtually positive, ranged from 8% (Middle East) to 148% (Russia). Among the ten strong importers, Russia ranked first with 148%, USA second with 112%, Europe third with 109%, and Asia fourth with 101%. For Vietnam, the structural effect positively contributed to the increase of its export to Philippine (77%), Indonesia (194%), Singapore (45%), Cote d'Ivoire (65%), China (145%) and Africa (63%) market. Obviously, the rice export from China was generally well-performed than that of Vietnam. However, the structural effect of Vietnam's export to China (145%) was stronger than that of China's export to Vietnam (75%).

Regarding to the competitive effect index, the results of China competitive effect revealed that the values were positive and varied across the target markets (except Malaysia (-5%), Cote d'Ivoire (-7%) and Asia (-1%)). The coefficients of this effect ranged from 1% (lowest) for Hong Kong to 109% (highest) for Africa market. This positive effect indicated the increase in the competitiveness of China's exports to these target markets. The same situation was also found in the case of Vietnam; competitive effects were contributed positively to the increase of its export to Philippine, Malaysia, Hong Kong, Singapore, Russia, Cote d'Ivoire, USA, Africa, Middle East, Asia and Europe market, ranged from 16% (Philippine) to 518% (Malaysia). Adversely, the negative values of competitive effect in Indonesia (-55%) and China (-23%) market had caused the descending in competitiveness of Vietnam's exports to these two markets. Though China's competitiveness effect in exporting to Vietnam (17%) was stronger than Vietnam exports to China (-23%), Vietnam rice exports were more competitive than that of China in target markets.

The second-order effect measures the influences of

the interaction between the changes in exporter's market share and the variation of importer's demand. Despite the fact that the changes in the second-order effect of both China and Vietnam were virtually positive for all target market, the magnitude of this effect still remained a relatively small impact on increasing Vietnam and China export growth to target markets.

At the second level CMS decomposition, the contributions of the growth effect to the ascending of total China rice exports came from Philippine, Malaysia, Hong Kong, Vietnam and Asia market. While that of Vietnam decomposition, growth effect was significantly positive in Philippine, Indonesia, Singapore, Cote d'Ivoire, China and Africa market, which were ranged from 315% (Philippine) to 1730% (Indonesia). Concurrently, the performance of this effect was revealed with low values and negative for both China and Vietnam export growth in Russia, USA, Middle East and Europe market. Overall, the growth effect of Vietnam during this period was more obvious than that of China.

Theoretically, the market effect indicated the market distribution effect of exporting country, weighted by the export shares of that country in target markets (Simonis, 2000). In the current study, the market effect of both China and Vietnam was positive in Russia, USA, Middle East and Europe market, implied that China and Vietnam both had their export share in these target markets.

To the general competitive effect index, China was revealed with positive signs and remained competitive in Indonesia, Singapore, Cote d'Ivoire, Russia, USA, Africa, Middle East and Europe market. Oppositely, the general competitiveness effect of Vietnam had caused the descending in competitiveness of Vietnam export value to Malaysia, Hong Kong, Russia, USA, China, Middle East, Asia and Europe with the negative values. Undoubtedly, the general competitiveness effect of China rice exports to target markets was stronger than that of Vietnam.

Concerning with the specific competitive effect, the contribution of this effect to the export performance of China to target markets was revealed insignificant in Indonesia, Singapore, Russia, Cote d'Ivoire, USA, Africa, Middle East and Europe market. It implied the weak competitive position of China in these target markets and was not the dominant factor affecting the export structure of China. On the other hand, the positive values from Vietnam decomposition in Malaysia, Hong Kong, Russia, USA, China, Middle East, Asia and Europe market indicated Vietnam still had a favourable influence of its export to these markets.

Conclusion

Given a surge of interest in investigating the comparative analysis of Vietnam and China rice exports to world markets, the CMS methodology was firstly applied to

Table 6. The results of CMS decomposition of the change in export value of China over 2008-2014 periods

Country	Change in export value	First-level decomposition				Second-level decomposition					
		Structural effect	Competitive effect	Second order effect	Growth effect	Market effect	General competitive effect	Specific competitive effect	Pure second-order effect	Dynamic structural effect	
Philippine	1.682	1.176	0.399	0.108	169.702	-168.526	-257.014	257.413	0.274	-0.167	
%	100	70	24	6	10087	-10017	-15277	15300	16	-10	
Indonesia	-6.526	-6.155	-2.853	2.482	247.213	-253.368	-565.504	562.651	-4.169	6.651	
%	100	94	44	-38	-3788	3883	8666	-8622	64	-102	
Malaysia	2.098	-0.756	-0.115	2.970	233.304	-234.060	-490.917	490.802	-0.147	3.117	
%	100	-36	-5	142	11119	-11155	-23397	23392	-7	149	
Hong Kong	15.400	15.097	0.185	0.117	187.089	-171.992	-308.071	308.256	0.151	-0.034	
%	100	98	1	1	1215	-1117	-2000	2002	1	0	
Singapore	-0.570	0.018	-0.487	-0.101	202.084	-202.066	-358.758	358.270	-0.459	0.359	
%	100	-3	85	18	-35430	35427	62899	-62813	81	-63	
Russia	-10.363	-15.328	-4.626	9.592	142.762	-158.090	-190.719	186.092	-2.413	12.005	
%	100	148	45	-93	-1378	1526	1840	-1796	23	-116	
Cote d'Ivoire	-83.572	-74.841	5.670	-14.401	234.325	-309.166	-496.004	501.673	7.296	-21.696	
%	100	90	-7	17	-280	370	594	-600	-9	26	
USA	-4.576	-5.104	-2.309	2.837	232.050	-237.154	-484.746	482.437	-2.907	5.744	
%	100	112	50	-62	-5071	5182	10592	-10542	64	-126	
Vietnam	15.367	11.489	2.606	1.271	229.068	-217.579	-470.403	473.010	3.186	-1.915	
%	100	75	17	8	1491	-1416	-3061	3078	21	-12	
Africa	-27.611	11.362	-30.155	-8.818	225.670	-214.309	-454.608	424.453	-35.675	26.856	
%	100	-41	109	32	-817	776	1646	-1537	129	-97	
Middle East	-6.505	-0.534	-6.924	0.953	225.499	-226.033	-453.826	446.902	-8.178	9.131	
%	100	8	106	-15	-3467	3475	6977	-6870	126	-140	
Asia	137.243	138.655	-0.850	-0.562	209.648	-70.994	-387.115	386.266	-0.861	0.299	
%	100	101	-1	0	153	-52	-282	281	-1	0	
Europe	-2.418	-2.638	-0.706	0.926	172.395	-175.033	-264.448	263.742	-0.499	1.425	
%	100	109	29	-38	-7129	7238	10936	-10906	21	-59	

Note: The data of China does not include the data from Hong Kong, Macao and Taiwan

Table 7. The results of CMS decomposition of the change in export value of Vietnam over 2008-2014 periods

Country	Change in export value	First-level decomposition					Second-level decomposition				
		Structural effect	Competitive effect	Second order effect	Growth effect	Market effect	General competitive effect	Specific competitive effect	Pure second-order effect	Dynamic structural effect	
Philippine	406.360	311.237	65.511	29.612	1281.476	-970.239	1126.997	-1061.486	45.061	-15.449	
%	100	77	16	7	315	-239	277	-261	11	-4	
Indonesia	107.904	209.006	-59.677	-41.425	1866.793	-1657.787	202.792	-262.469	-87.188	45.763	
%	100	194	-55	-38	1730	-1536	188	-243	-81	42	
Malaysia	-24.228	191.919	-125.618	-90.529	1761.758	-1569.839	426.246	-551.864	-160.045	69.516	
%	100	-792	518	374	-7272	6479	-1759	2278	661	-287	
Hong Kong	-1030.156	70.591	-553.286	-547.460	1412.770	-1342.180	974.037	-1527.324	-451.366	-96.094	
%	100	-7	54	53	-137	130	-95	148	44	9	
Singapore	197.413	88.939	66.509	41.964	1526.007	-1437.068	822.184	-755.675	62.707	-20.743	
%	100	45	34	21	773	-728	416	-383	32	-11	
Russia	-7.098	10.631	-12.675	-5.054	1078.042	-1067.411	1325.612	-1338.287	-6.612	1.558	
%	100	-150	179	71	-15187	15037	-18675	18853	93	-22	
Cote d'Ivoire	151.849	98.100	31.952	21.797	1769.466	-1671.366	411.008	-379.057	41.115	-19.318	
%	100	65	21	14	1165	-1101	271	-250	27	-13	
USA	-784.082	19.582	-403.627	-400.037	1752.288	-1732.706	444.735	-848.362	-508.001	107.964	
%	100	-2	51	51	-223	221	-57	108	65	-14	
China	284.165	411.576	-64.183	-63.228	2302.938	-1891.362	-1321.704	1257.521	-175.628	112.400	
%	100	145	-23	-22	810	-666	-465	443	-62	40	
Africa	344.023	217.839	83.597	42.587	1704.114	-1486.275	535.027	-451.429	98.900	-56.314	
%	100	63	24	12	495	-432	156	-131	29	-16	
Middle East	-115.366	30.383	-107.217	-38.532	1702.821	-1672.438	537.367	-644.584	-126.634	88.102	
%	100	-26	93	33	-1476	1450	-466	559	110	-76	
Asia	-82.364	90.676	-90.027	-83.013	1583.126	-1492.450	737.228	-827.254	-91.278	8.265	
%	100	-110	109	101	-1922	1812	-895	1004	111	-10	
Europe	-11.378	10.027	-14.915	-6.490	1301.816	-1291.789	1104.727	-1119.642	-10.537	4.047	
%	100	-88	131	57	-11442	11354	-9710	9841	93	-36	

Note: The data of China does not include the data from Hong Kong, Macao and Taiwan

evaluate the rice trade competitiveness and analysis was carried out using the data on rice export performance between Vietnam and China export values of both China and Vietnam to that can give a comprehensive description on the selected target markets over 2000-2014 periods. factors that may affect to their export status. This The decomposition of export growth revealed that

structural effect and the growth effect were the most dominant contributors to the increase in rice export growth of Vietnam and China in both two sub-periods. Moreover, the analysis of competitive

effects appeared that China and Vietnam both had strong competitive advantage in Philippine, Singapore, Africa and Middle East market. In the first period 2000-2008, the rice exports from China to target markets were predominant than that of from Vietnam. Adversely, the export value from Vietnam to target markets had been outweighed than that of China since China lose its market share in the second period. Decomposition results also revealed that Vietnam and China were appeared to have export potential over all target markets during the period of analysis.

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