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Evaluation Of The Composite Export Similarity Index On The Example Of
China

Evaluación Del Índice De Similaridad De Exportación Compuesta Sobre El
Ejemplo De China

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Abstract.

The purpose of this article is to enhance the Export Similarity Index to provide more reliable results on whether and to what extent two countries are potential and immediate competitors in the global trade. To achieve this existing methodology was complemented with the set of geographical destinations. This allows the evaluation of the overlap in export portfolios of two or more countries and understanding the possible level of their competition in international trade. To prove the efficiency of this enhanced index China's export portfolio was compared with 50 largest exporters. Achieved results demonstrate a strong overlap of Chinese trade with Vietnam, Japan, and the Philippines proving the veracity of the introduced methodology.

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Keywords: international trade, bilateral trade, export competitiveness, global export.

Resumen.

El propósito de este artículo es mejorar el Índice de similitud de exportación para proporcionar resultados más confiables sobre si dos países son competidores potenciales e inmediatos en el comercio mundial y en qué medida. Para lograr esta metodología existente se complementó con el conjunto de destinos geográficos. Esto permite evaluar la superposición de las carteras de exportación de dos o más países y comprender el posible nivel de su competencia en el comercio internacional. Para demostrar la eficiencia de este índice mejorado, se comparó la cartera de exportaciones de China con los 50 mayores exportadores. Los resultados obtenidos demuestran una fuerte superposición del comercio chino con Vietnam, Japón y Filipinas, lo que demuestra la veracidad de la metodología introducida.

Palabras claves: comercio internacional, comercio bilateral, competitividad de exportación, exportación global.

Introduction

For the past two decades, international trade is rapidly increasing outpacing the growth rate of the global economy and manufacturer capacities. The total world's exports tripled from 6.13 trillion USD in 2001 to 19.3 trillion USD in 2018. This growth was accompanied by the shift of the geographical center of trade from Europe and the USA to the emerging countries in Asia making it indissolubly related to the rise of China as the new economic powerhouse (Johansson, Olaberría, 2014). The share of China in global exports had grown from 4.3% (266 bln USD) in 2001 to 12.9% (2.41 trln USD) in 2018 effectively making China an undisputed leader of international trade in commodities with an ambition to surpass United States as the world's largest economy producing an annual growth of GDP of 6.6%. The rise of China was accompanied by significant changes in its export portfolio both in types of commodities exported and of destinations of export. In 2001 China was associated with textiles, apparel, and clothes; in 2018 it is the major producer of mobile phones and electronic circuits.

The rapid ascension of China has led to numerous conflicts with other major global exporters. China is regularly accused of using prohibited trade practices and is a subject of several anti-dumping investigations launched by the EU and the USA. The market economy of China is disputed and the European Commission has twice refused to acknowledge it (Wang, Liu, 2015). Though the sentiment concerning the quality of Chinese products is still strong with Western consumers it is indisputably that with each passing year traditional manufacturers from the USA and Europe in all industries feel the increasing pressure from Chinese competitors (Schniederjans et al., 2011). Simultaneously changes in global export patterns are making it more difficult to understand which specific industries and trade partners contributed the most to the rise of China and where exactly each particular economy or producer may face the pressure of Chinese competitors. In these conditions, it is increasingly important to have a reliable method of determining the probability of competition in different industries and on different markets.

The widely used method of measuring competitiveness and comparing export portfolios is the Export Similarity Index (ESI). The ESI was first introduced in 1974 by Finger and Kreinin (1979), further discussed in the work of Kellman and Schroder (1983) and included in the “A Handbook of commonly used trade indices and indicators” by Mikic and Gilbert (2007) along with the other commonly used trade indicators. ESI is particularly popular among Asian scholars, it was utilized by H. Didarul (2006) to measure competitiveness in South Asia, by Erlat and Ekmen (2009) to measure the export similarity between Turkey and EU, by Wang and Liu (2015) to for China and EU, and K.K. Li (2018) on China and India.

Materials and methods

The export similarity is not a concept invariably linked to competitiveness. Calculation of ESI may serve multiple purposes including analysis of the effect of trade barriers; evaluation of export similarity in terms of export compositions and the effects of regional integrations; measurement of comparative threat one country poses to another on the global market; revealing relative sophistication of a country's exports (Schoot, 2004; Erlat, Ekmen, 2009). The basic methodology of the Index used by contemporary researchers remains the same as it was introduced in 1979 and calculated by the following formula (Finger, Kreinin, 1979; Mikic, Gilbert, 2007; Wang, Liu, 2015):

$$ESI_{a,b} = \left\{ \sum_i \min\left(\frac{x_{ad}^i}{X_{ad}}, \frac{x_{bd}^i}{X_{bd}}\right) \right\} \times 100$$

where a and b are the countries of interest, d is the country or region of export's destination, i is the set of commodities or industries, x is the specific commodity export flow, and X is the total export flow. The index may take the value between 100 (complete export overlap) and 0 (no similarities in export portfolios).

All of the abovementioned studies utilize ESI to measure the competitiveness of two or more countries on the global or broad regional markets, this type of calculation is even presented in default in the handbook by Mikic and Gilbert (2007). However, the ESI

was introduced specifically to measure the similarity of export portfolios of two countries (or groups) to the same third market (Finger, Kreinin, 1979). Measuring the global export similarity with no particular trade partner defined as an export destination will not provide reliable insight on whether the two countries in question will be competitors since they can have entirely different geography of trade. For example, if China is supplying vehicles to Iran it will not be considered as an immediate direct competitor to Japan that is not supplying any significant number of vehicles to the same destination. Not to mention the quality and technological differences between two commodities of the same type that is not discussed in this article.

This limitation may be rectified by complementing the calculation of the basic Export Similarity Index with trade destinations. The methodology of the ESI will remain the same but instead of measuring the similarity of the commodities portfolio the geography of exports will be compared. This method was proposed particularly by Xu and Song (2000) but unlike ordinary ESI is rarely utilized. For example, China and the Czech Republic have very similar commodities export portfolios (ESI = 70 in 2018) however their geography of trade is entirely different (Table 1). For the sake of simplicity comparison in this example covers only continents and not actual 150 destinations as in Table 2.

Table 1. China and Czech Republic global exports, 2018, bln of US\$

Destination (d)	Exporter			
	China (a)		Czech Republic (b)	
	Value (x_{ad})	Share (x_{ad}/X_{ad})	Value (x_{bd})	Share (x_{bd}/X_{bd})
Africa	104.96	0.04	2.08	0.01
Asia	1192.63	0.48	11.47	0.06
America	663.46	0.27	6.42	0.03
Europe	475.77	0.19	177.02	0.89
Oceania	57.33	0.02	0.55	0
Total (X)	2494.23	1.0	198.42	1.0

Source: International Trade Center (ITC), 2020

By calculating the Export Similarity Index of China and the Czech Republic with destinations instead of commodity groups we will obtain far lower overlap of two portfolios. The result proves that however similar commodities China and Czech Republic supply to the global market, it is highly unlikely for them to meet the same potential consumers since their export destinations are different. The limitation for this method is the existence of re-export, intermediaries and secondary markets. To acquire more accurate results in this article we propose a new method, a Composite Export Similarity Index (CESI) that utilizes both indexes simultaneously and calculated by the following formula:

$$CESI = \frac{(ESI_c + ESI_d)}{2}$$

where ESI_c is Export Similarity Index of Commodities and ESI_d is Export Similarity Index of Destinations. Both components must not be equal to zero ($ESI_c, ESI_d > 0$). The following integral index may be used only to compare the overlap in trade on the global or broad regional market since it needs to utilize more than two existing destinations.

To test the reliability of this proposed new index in this article the export portfolio of China is compared with 40 other major global exporters as of 2018. ESI is not affected by relative size or scales of total exports which are particularly important in the case of China. The analysis is based on panel data of the 2001-2018-time period provided by the International Trade Center categorized according to the Harmonized System on a 2-digit level that includes 97 groups of commodities (International Trade Center, 2020). To evaluate the geographic similarity of export for each of 40 analyzed country-exporter 246 destinations were considered including importing countries, special economic zones and dependencies (SAR Hong Kong, French Guinea, etc.) and areas (America not elsewhere specified (NES), Africa NES, etc.). All data on trade in commodities is provided according to the Harmonized Commodity Description and Coding System (HS). The main limitation of this research is the usage of 2-digit level data, which are relatively aggregated compared to 4-digit.

Results and Analysis

The output data of the calculations are presented in Table 2 and visualized on Figures 1-2. According to the achieved results trade portfolio of China has significantly changed since 2001 both in commodities and destinations of export; however, the trends that led to such developments are evident and explainable by the nature of the Chinese economy and manufacturing. On 11 December 2001 China became a member of the World Trade Organization (WTO). Membership in this organization was pivotal not only to Chinese external trade but also to its economic policy, government structure, and society. Joining the WTO was largely motivated by China's concern that access to Western markets may shrink because of the gradual expansion of the EU and the formation of NAFTA (Khan, 2004). Back in 2001 Chinese export was concentrated on USA (20.4% of total export), Japan (16.9%) and EU15 (15.4%) making these three markets critical for the emerging world's largest manufacturer. Since then Chinese export became more geographically diversified with USA and Japan share of total exports in 2018 shrinking to 16.8% and 5.7% respectively and a lot of small and subtle developments in trade with numerous other partners bringing the total share of Africa to 4% in 2018 (2% in 2001).

In the same time period of 2001-2018 changes in commodities nomenclature of Chinese trade. Most noticeable was the switch from low-quality cheap consumer goods (HS61 Articles of apparel and clothing; 5.06% in 2001, 2.86% in 2018) to more advanced commodities. As of 2018 49% (141.7 bln USD) of the world's total export of mobile phones, 40.5% (154.2 bln USD) of computer devices is attributed to China. China also enjoyed steady growth in the production and export of vehicles, including motor cars: 4.9% (75 bln USD) of global export in 2018 as opposed to 0.9% (4.7 bln USD) virtually building its own automotive industry from a scratch (International Trade Center, 2020; [World Bank, 2020](#)).

These changes in China's export pattern affected the probability of its competition with various countries. The visualized result (Figs. 1-2) indicates that the majority of 40 potential competitors of China in 2018 can be sorted in 3 clusters: countries of Eastern

Asia with high export similarity to China (Republic of Korea, Malaysia, Indonesia, Singapore, Japan, India); countries of Europe and with similar commodities nomenclature but a low likeness of geography portfolio (Hungary, Czech Republic, Austria, Portugal, etc.); countries of Middle East specialized in the export of raw materials and fossil fuels little to none overlap with Chinese exports (Saudi Arabia, Iran, Qatar, Kuwait).

Table 2. Export Similarity (ESI) of PRC and top 40 global exporters (in alphabetical order)

No	Country	Code	2001			2018			Δ 2001-2018		
			ESlc	ESId	CESI	ESlc	ESId	CESI	ESlc	ESId	ECI
1.	Australia	AUS	31.8	61.79	46.8	18.2	40.44	29.32	-13.6	-21.35	-17.48
2.	Austria	AUT	62.2	31.52	46.86	63.82	35.55	49.69	1.62	4.03	2.83
3.	Belgium	BEL	50.11	31.91	41.01	45.48	36.74	41.11	-4.63	4.83	0.1
4.	Brazil	BRA	43.74	54.13	48.94	31.16	50.56	40.86	-12.58	-3.57	-8.08
5.	Canada	CAN	43.13	32.07	37.6	38.24	38.08	38.16	-4.89	6.01	0.56
6.	Chile	CHL	20.95	58.48	39.72	14.88	48.79	31.84	-6.07	-9.69	-7.88
7.	Czech	CZE	63.86	25.72	44.79	70.33	27.04	48.69	6.47	1.32	3.9
8.	Denmark	DNK	59.3	35.35	47.33	59.63	33.92	46.78	0.33	-1.43	-0.55
9.	Finland	FIN	56.74	41.88	49.31	50.71	40.3	45.51	-6.03	-1.58	-3.8
10.	France	FRA	58.06	39.89	48.98	55.8	43.15	49.48	-2.26	3.26	0.5
11.	Germany	DEU	55.19	38.48	46.84	63.02	40.79	51.91	7.83	2.31	5.07
12.	Hungary	HUN	66.16	27.5	46.83	70	27.72	48.86	3.84	0.22	2.03
13.	India	IND	52.58	64.01	58.3	48.25	66.06	57.16	-4.33	2.05	-1.14
14.	Indonesia	IDN	53.68	68.13	60.91	39.71	58.43	49.07	-13.97	-9.7	-11.84
15.	Iran	IRN	12.93	28.89	20.91	18.47	14.04	16.26	5.54	-14.85	-4.65
16.	Ireland	IRL	44.76	47.45	46.11	25.76	47.19	36.48	-19	-0.26	-9.63
17.	Italy	ITA	63.64	41.14	52.39	66.95	44.61	55.78	3.31	3.47	3.39
18.	Japan	JPN	54.64	64.21	59.43	61.22	66.96	64.09	6.58	2.75	4.66
19.	Korea, Rep. of	KOR	62.22	71.8	67.01	68.69	63.43	66.06	6.47	-8.37	-0.95
20.	Kuwait	KWT	8.7	44.46	26.58	10.15	6.46	8.31	1.45	-38	-18.27
21.	Malaysia	MYS	55.74	69.02	62.38	62.54	62.85	62.7	6.8	-6.17	0.32
22.	Mexico	MEX	64.39	29.14	46.77	61.89	32.24	47.07	-2.5	3.1	0.3
23.	Netherlands	NLD	48.55	28.99	38.77	57.11	35.3	46.21	8.56	6.31	7.44
24.	Norway	NOR	23.9	32.19	28.05	21.24	30.19	25.72	-2.66	-2	-2.33
25.	Poland	POL	60.24	24.92	42.58	65.01	27.61	46.31	4.77	2.69	3.73
26.	Portugal	PRT	62.13	28.84	45.49	57.49	31.27	44.38	-4.64	2.43	-1.11
27.	Qatar	QAT	8.44	35.99	22.22	12.62	38.3	25.46	4.18	2.31	3.24
28.	Romania	ROU	59.87	27.89	43.88	66.08	27.5	46.79	6.21	-0.39	2.91

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29.	Russia	RUS	23.42	30.93	27.18	20.21	38.37	29.29	-3.21	7.44	2.11
30.	Saudi Arabia	SAU	11.76	8.65	10.21	16.03	13.47	14.75	4.27	4.82	4.54
31.	Singapore	SGP	54	62.03	58.02	61.18	59.4	60.29	7.18	-2.63	2.27
32.	Slovakia	SVK	54.51	21.93	38.22	61.74	25.65	43.7	7.23	3.72	5.48
33.	South Africa	ZAF	38.72	54.59	46.66	33.47	45.98	39.73	-5.25	-8.61	-6.93
34.	Spain	ESP	53.54	31.21	42.38	52.14	37.03	44.59	-1.4	5.82	2.21
35.	Sweden	SWE	56.42	44.02	50.22	54.77	38.07	46.42	-1.65	-5.95	-3.8
36.	Switzerland	CHE	46.47	49.17	47.82	32.08	57.61	44.85	-14.39	8.44	-2.97
37.	Turkey	TUR	55.03	36.76	45.9	55.2	39	47.1	0.17	2.24	1.2
38.	UK	GBR	57.76	46.77	52.27	51.02	49.54	50.28	-6.74	2.77	-1.99
39.	USA	USA	59.46	45.22	52.34	54.15	48.99	51.57	-5.31	3.77	-0.77
40.	Vietnam	VNM	44.47	58.81	51.64	67.28	70.62	68.95	22.81	11.81	17.31

Source: International Trade Center (2020); Author's calculations

As in 2018 most similar to the export portfolio of China are established and rising nations of Asia: Vietnam (CESI = 69), Republic of Korea (66), Japan (64) and Malaysia (63). All of these countries specialize in exporting processed consumer and capital goods such as machinery & mechanical appliances (HS84), electrical machinery and equipment (HS85) and supply them to the USA, South-Eastern Asia, and Western Europe. The lowest similarity in commodities trade is observed between China and raw-material (namely crude oil and gas) exporters: Kuwait (8.31), Saudi Arabia (14.75) and Iran (16.26). In 2001-2018 most noticeable decrease can be observed in the export similarity of China with Kuwait (CESI decreased by 18.27 points), Australia (-17.5%) and Indonesia (-12%). A significant drop of overlap with Kuwait can be attributed to the limitations of statistics since the primary destinations of Kuwait's exports in 2018 are Areas Non-Specific Elsewhere (90.9%), meaning that International Trade Center does not possess exact information on buyers of Kuwait petroleum oils. The decrease of CESI in case of Indonesia is explained by the growing share of the Animal or vegetable fats (HS15, 2.58% in 2001; 11.29% in 2018) in the export portfolio of this country, as well as growth of its export to China (3.9%, 2001; 15.1%, 2018).

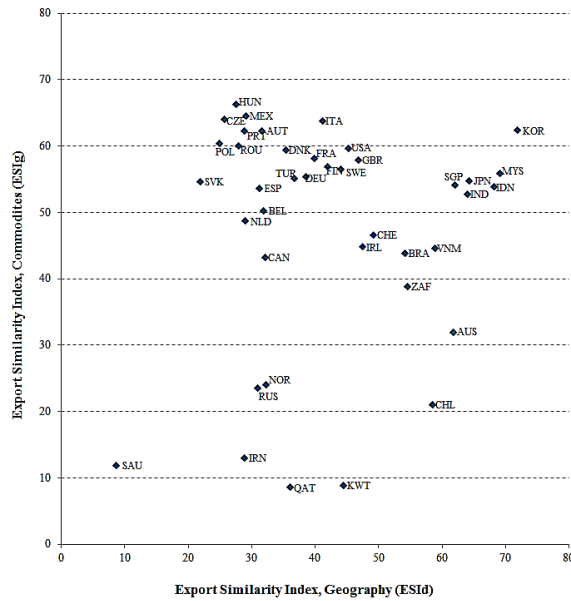


Figure 1. Export similarity of China and 40 major global exporters, 2001

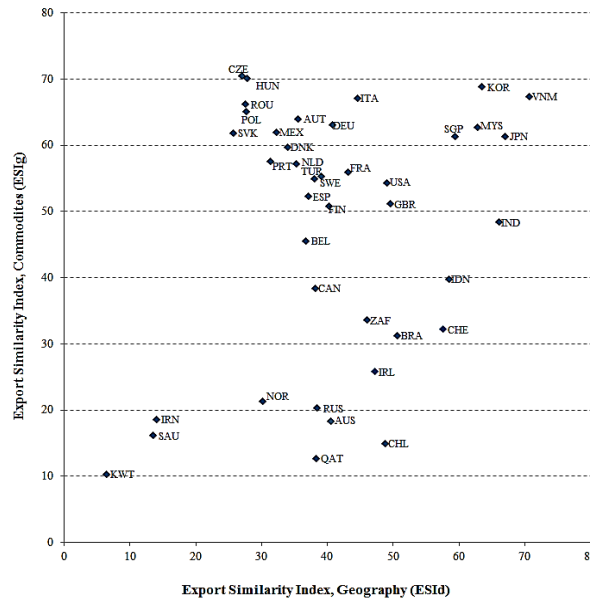


Figure 2. Export similarity of China and 40 major global exporters, 2018

The positive changes indicating the overlap of trade portfolios were observed in similarity with Vietnam (CESI increased by 13.31), Netherlands (+7.44) and Slovakia (+5.48). The most considerable is the change of export similarity with Vietnam; in 2018 this country became the most probable competitor to China on global markets both in terms of commodities and destinations of export (Figure 3).

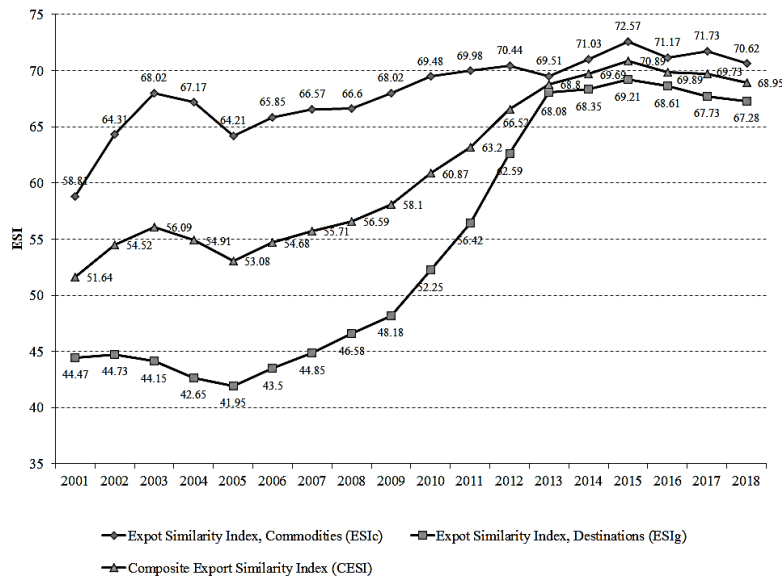


Figure 3. Export Similarity Indexes of China and Vietnam, 2001-2018

Source: The International Trade Center (2020); Author’s calculations

In 2009 and earlier Vietnam was not considered to be of any significant similarity or competition to China. In an extensive paper on the subject of possible China-Vietnamese competition, Chaponnière and Cling (2009) stated that Vietnam and China mostly specialize on different products with the noticeable exception of textile & clothing, but also acknowledged that Vietnam started the modernization of its economy. The future competition of Vietnam and China was predicted and largely attributed to the commitment to WTO and implementation of ASEAN-China Free Trade Area (ACFTA) by Vietnam in 2015. According to T.H.V. Ha (2011), this agreement contributed to the increase in competition level with China in the traditional markets of both countries such as the United States, Japan, and the EU. Since 2010 the similarity of destinations (ESID) of China and Vietnam soared primarily due to the reorientation of Vietnamese exports on the USA (7.1% of total Vietnamese exports in 2001; 19.6% in 2018), Canada (0.7%; 1.2%), Mexico (0.3%; 0.9%) and other countries of America (Share of America Aggregation region in total exports of Vietnam changed from 8.9% in 2001 to 23.6% in 2018). The export portfolio of Vietnam to the American region also changed significantly. In 2001 Vietnam supplied American countries (primarily USA) with fish and crustaceans (HS03, 36% in 2001; 2.66% in 2018) and mineral fuels (HS27, 17%; 0.12%) while in 2018 main export

commodities to the same region became electrical machines (HS85, 0.18% in 2001; 23% in 2018) and clothing (HS61, 1.3%; 15%) effectively making Vietnam direct competitor of China.

The growing competition between China and Vietnam in textiles, apparel and clothing, and footwear was outlined in 2017 in an extensive study of comparative trade relations of these countries (Ma et al., 2017). Outlined developments in trade are also accompanied by similar changes in finances and politics with Vietnam becoming the new destination of USA foreign investment infusions while the modernization of the country and rapid development of IT and hi-tech industries are continually pushing the competition with China even further (Pritesh, 2020). The case of China and Vietnam proves that the proposed Composed Export Similarity Index reflects the actual situations and may be utilized to identify directions of further research as well as serve the reliable indicator of international trade analysis. However, all three Export Similarity Index variations described in this article have similar limitations and shortcomings.

When comparing the profiles of two countries usually we have to use statistics from one source for the sake of continuity, however, the data retrieved from international organizations such as International Trade Center may prove to be incomplete or distorted for various reasons, especially in case of nations with ongoing internal conflict (Iraq, Syria), loss or change in territorial integrity (Sudan and South Sudan), lack of cooperation on an international level (People's Democratic Republic of Korea) or complex schemes established by offshore zones and jurisdictions (Hong Kong, Ireland, Kuwait, United Arab Emirates, etc.). In every specific case, this incomplete data may be at least partially restored by applying the mirror-data method.

The export Similarity index is biased by re-exports in a similar matter. If the country is exporting through the intermediary or an off-shore jurisdiction it is increasingly difficult to understand the true geography of its trade. It is particularly true in the case of China that in 2001-2018 exported on average of 15% of its total export of commodities to SAR Hong Kong. The purpose of these transactions is re-exportation. It is a known fact for economists that the standard methods for data reconciliation of bilateral trade have generally not worked well for China and its major trading partners because of the

intermediary role of Hong Kong. A complex mathematical programming model to simultaneously estimate re-export markups and reconcile bilateral trade statistics may be applied to create more reliable panel data for China and Hong Kong or any other particular country of interest involved in intense re-exporting activity (Wang et al., 2007).

What matters the most is the fact that CESI does not consider the size of two compared economies or the size of their exports. It is especially noticeable in the case of China and its neighboring Asian nations since their economy (even combined) is only a small fraction of the Chinese powerhouse. Although the economy Vietnam is becoming more sophisticated and export are overlapping with China both in terms of commodities portfolio and destinations it is highly unlikely that this country will provide major competition on the global market and most certainly will not replace China as a top exporter and manufacturer (Yen, 2019). Because of this proposed CESI index should be considered as an effective method to localize and identify the field of future research, as was demonstrated in this article is an example of China and Vietnam, but it would be imprudent to rely on it as on the sole indicator to compare export portfolio of two countries.

Conclusiones

The purpose of this study was to explore the existing methodology of comparing export of two potential competitors by using the Export Similarity Index and to enhance it by implementing the new method that combines commodity and destination portfolio of exports. To test the proposed methodology China was selected as the major global manufacturer and exporter. By examining the export similarity between China and 40 major global exporters, the conducted study showed that China's most probable competitors as of 2018 are its neighboring Asian economies of Vietnam, Republic of Korea, Japan, Malaysia and Singapore. The least probable competitors of China with little to none overlap with its exports are oil exporting economies of Kuwait, Saudi Arabia and Iran.

By examining the trade relations of China and Vietnam more closely in this study we proved that the pattern identified during the calculation of the Export Similarity Index was indeed present and attributed to the modernization of Vietnamese economy,

reorientation of its exports on American continent, influx of USA investments and political tensions with China. Conducted analysis proves the veracity of the proposed Composed Export Similarity Index and outlines its limitations.

References

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- Chaponnière, J.R., & Cling, J.P. (2019). Vietnam's export-led growth model and competition with China. *Économie Internationale*, 2, 101-130.
- Didarul, H. (2006). Measuring export competitiveness in South Asia: Export similarity index approach. *The Chittagong University Journal of Social Sciences*, 24(1), 141-152.
- Erlat, G., & Ekmen, S. (2009). Export similarity and competitiveness: The case of Turkey in the EU market. In: *Proceedings of Anadolu International Conference in Economics*, pp. 1-27. Eskişehir: Anadolu University.
- Finger, J.M., & Kreinin, M.E. (1979). A measure of "export similarity" and its possible uses. *The Economic Journal*, 89(356), 905-912. doi: <https://doi.org/10.2307/2231506>
- Ha, T.H.V. (2011). Intermediate goods trade between Vietnam and China. In: M. Kagami (ed.), *Intermediate Goods Trade in East Asia: Economic Deepening Through FTAs/EPAs*. Bangkok: Bangkok Research Center.
- International Trade Center. (2020). Retrieved from <http://www.trademap.org>
- Johansson, A., & Olaberría, E. (2014). *Global trade and specialization patterns over the next 50 years*. Paris: OECD Publishing.
- Kellman, M., & Schroder, T. (1983). The export similarity index: Some structural tests. *The Economic Journal*, 93(369), 193-198. doi:10.2307/2232173
- Khan, M.T. (2004). *China, WTO and the developing countries: a constructivist analysis*. Ankara: Ministry of Foreign Affairs of the Republic of Turkey.
- Li, K.K. (2018). China and India trade competition and complementary: Analysis of the "Belt and Road" background. *Modern Economy*, 9, 1213-1227.
- Ma, T., Liu, Y., & Ge, Y. (2017). A comparative study of trade relations and the spatial-temporal evolution of geo-economy between China and Vietnam. *Sustainability*, 9, 944.
- Mikic, M., & Gilbert, J. (2007). *Trade statistics in policymaking: A handbook of commonly used trade indices and indicators*. Bangkok: United Nations ESCAP.

- Pritesh, S. (2020). US – China trade war inspires Vietnam growth. Vietnam Briefing. Retrieved from <https://www.vietnam-briefing.com/news/us-china-trade-war-inspires-vietnam-growth.html/>
- Schniederjans, M.J., Cao, Q., Schniederjans, D., & Gu, V.C. (2011). Consumer perceptions of product quality revisited: Made in China. *Quality Management Journal*, 18(3), 52-68. doi: 10.1080/10686967.2011.11918322
- Schoot, P.K. (2004). The relative similarity of China's exports to the United States vis a vis other U.S. trading partner. Unpublished Manuscript, 7, 15-23.
- Wang, P., & Liu, X. (2015). Comparative analysis of export similarity index between China and EU. In: *International Conference on Management Science and Management Innovation*, pp. 222-227. Guilin: Atlantis Press. doi: <https://doi.org/10.2991/msmi-15.2015.42>
- Wang, Z., Gehlhar, M., & Yao, S. (2007). Reconciling trade statistics from China, Hong Kong and their major trading partners: A mathematical programming approach. Retrieved from https://www.researchgate.net/publication/5081714_Reconciling_Trade_Statistics_from_China_Hong_Kong_and_Their_Major_Trading_Partners--A_Mathematical_Programming_Approach
- [World Bank. \(2020\). Retrieved from http://www.worldbank.org](http://www.worldbank.org)
- Xu, X., & Song, L. (2000). Export similarity and the pattern of East Asian development. In: P.J. Lloyd, & Z. Xiao-Guang (eds.), *China in The Global Economy*, pp. 145-165. Cheltenham: Edward Elgar Publishing.
- Yen, N.L. (2019). These charts show Vietnam is far from matching China's manufacturing prowess. Retrieved from <https://www.cnbc.com/2019/10/29/trade-war-can-vietnam-replace-china-as-a-global-manufacturing-hub.html>