Analyzing the Export Competitiveness of Pakistan's Leather Industry within EU-27 and U.S. Markets

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Current study aims at to measure comparative advantage and competitiveness in the leather and leather products of Pakistan in EU-27 and American economies during 2004 to 2021. The present study employed Revealed Comparative Advantage (RCA), Symmetrical Comparative Advantage (SRCA), Normalized Revealed Comparative Advantage (NRCA), Relative Export Advantage (REA), Trade Balance Index (TBI), Vollrath index (RCA#) and Additive Revealed Comparative Advantage (ARCA) indices to measure competitiveness, competitive and comparative advantage of Pakistan's leather exports. The findings of RCA, SRCA, REA and Vollrath index highlight that Pakistan enjoyed a high comparative advantage in EU-27 and American economies. The findings of TBI portrays that Pakistan is the net-exporter in EU-27 and American economies. The NRCA index's findings display that the economy of Pakistan experienced a comparative advantage in this industry in the EU-27 and American countries during 2004-2021. The positive ARCA index represents comparative advantage during the selected time span in EU-27 and American markets. There is a dire need to boost the leather sector's comparative and competitive advantage through policy support and facilitation by all stakeholders in order to achieve growth in the livestock and agriculture sectors and increase the income of connected stakeholders.
Keywords: Competitiveness, exports, leather sector, RCA, ARCAm, American economies, rade balance Index (TBI).
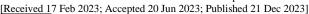
INTRODUCTION

Competitiveness is a country's ability to increase market share, profits, value added, and to remain competitive in international market for a long period of time. This is accomplished through developing market authority and activity based on comparative and competitive advantages (Mousavi *et al.,* 2018). The Leather Industry plays an important role in Pakistan's economy as it is among the top ten foreign exchange earners for the country. The leather industry contributes significantly to GDP and also has the potential to enhance export volume by adding some innovative diversifications and improving commodity quality (Maqbool *et al.,* 2018). The foreign shipments of leather products from Pakistan increased by 8.86 % and from 765.35 million dollars in the year 2019-20 to 833.19 million dollars in the year 2020-21, according to the report of Tanners Association of Pakistan (2020-2021). This is a great source of satisfaction for the leather exporters, as the increase was from $765.35 million in fiscal year 2019-20 to $833.19 million in

fiscal year 2020-21. The leather business in Pakistan is the second largest export industry after textiles, accounting for approximately 5.4 percent of total exports in 2020.
The leather exports of Pakistan have a major share in total exports of Pakistan to EU-27 economies. The share of leather exports was 7.32% in 2004 and increased to 7.99 % in 2005 in the total exports of Pakistan to EU- 27 countries. This share was recorded high in 9.29 % in the years 2008-09 because the demand of these leather goods was increased in Europe. After 2009, the share of leather products decreased, and it was recorded 4.42 % in the year 2021. The share of Pakistani leather products in EU-27 countries was 1.93 % in 2004, and it increased to 2.30% in 2005. This share got decreased from 2010 and reached a lower level at 1.38 % in 2021. This share declined due to system collection of hides and skins, lack of investments, lack of international leather brands, fewer incentives to manufacturing units and lack of vocational training institutes in Pakistan.
The share of leather exports in the total exports of Pakistan to American economies was 3.05 % in 2004 and decreased to

2.45% in 2005. The average share of leather exports in total exports of Pakistan was approximately 3.14 % during 2004-2021. The share of leather exports of Pakistan was .95 % in American economies in 2004 and remained constant in 2005. This share had an increasing and decreasing trend in remaining years, and it was recorded high at 1.22 % in the years 2020 and 2021. The share of Pakistani leather products remained higher in EU-27 economies as compared to American economies throughout the time span of 2004-2021(ITC, 2021).

The concept of competitiveness has been theoretically linked to several theories of international trade (Sofia, 2004). According to the theory of Adam Smith, the trade of economies with each other is depend on absolute advantages-the economy produce a commodity in which it has an absolute advantage and will exchange it for the commodities in which it has no such type advantage. After this, Ricardo was presented his view about comparative advantage (CA), and stated that international trade is depend on CA not absolute advantage. Even though competitiveness is not ensured by technological superiority, Ricardo is of the view that economies should have specialization in the commodities having a CA in order to maximize their economic output (Mizik *et al.*, 2020). The Heckscher and Ohlin hypothesis (H-O theory) states that nations with various resources or factor endowments trade with one another and that a nation's comparative advantage is based on its relative factor scarcity in comparison to a group of other nations. According to these early trade theories, the fundamental drivers of global commerce are differences in technology and/or endowments. Even if some other brand-new models have appeared, the comparative advantage theory is still widely accepted. In order to explain these efficiency differences, new trade theories place a significant emphasis on increasing returns, product differentiation, consumer preferences, externalities, and innovation. A nation's comparative advantage could alter as a result of shifts in supply and demand on both home and foreign markets (Widodo, 2009).

The purpose of this study is to measure the export performance and competitiveness in the leather and leather products in EU-27 and American economies during 2004-2021. This research employed RCA, SRCA, REA, Vollrath index, NRCA, TBI and ARCA to measure comparative advantage in the leather exports to EU-27 and American economies.

This current study consists of different sections to examine the comparative advantage and competitiveness in leather exports of Pakistan. Section 1 comprises introduction, objectives of the study, section 2 summarizes the literature review about different studies RCA and section 3 summarizes the data and methodologies in details. In section 4, the present study discusses results and discussion and the last section discuss the conclusion and policy recommendations for the study.

Review of literature: Anwar et al. (2005) investigated the competitiveness and comparative advantage in the wheat crop of Pakistan during 2001-03. Hoen and Oosterhaven (2006) worked on the significance of additive revealed comparative advantage index (ARCA) and proposed an alternative, additive RCA, running from +1 to -1. Czifra (2006) concluded that the competitiveness, examined by (RCA), of the Hungarian agricultural sector has not changed significantly. RCA index was employed by Khatibi (2008) to measure CA of Kazakhstan in the EU-27 economies and concluded that Kazakhstan had a declined CA in different sectors. The method of RCA was utilized by Lorde (2009) to scrutinize the export performance of CARICOM economies during 1992-2006. Different countries had faced CA with the world in beverages and tobacco, fuels and lubricants, food and live animals and chemical related products. Sachithra et al. (2012) employed some indices of RCA to examine CA in the leading exports of Sri Lanka. This study find out that Sri Lanka had a CA in the selected exports in the world market. The findings of this analysis illustrated that Pakistan faced comparative disadvantage. Ahmad and Kalim (2013) measured competitiveness and CA in Pakistan's textile and clothing sector by utilizing RCA index. The results of this research indicated that Pakistan was faced CA in this sector. Akhtar et al. (2013) examined the CA in the horticultural sector of Pakistan. The findings of this analysis illustrated that Pakistan faced a CA. Similarly, the RCA index was used by Shahab and Mahmood (2013) to examine the export CA in the leather sector of Pakistan in selected Asian economies and concluded that Pakistan enjoyed CA in these countries during the analysis. The method of RCA was utilized by Erkan and Sarıçoban (2014) measured the exports competitiveness of Turkey and EU-13 countries in science-based products. Oduro and Offei (2014) employed four RCA indices to measure export competitiveness of Ghana in global market during 2004-2011. Different indices of RCA were utilized by Lgnjatijevic et al. (2014) to measure the CA of Serbia in the processed food sector exports to Danube region. Shahzad (2015) conducted a study to inspect the CA in the textile and clothing sector of Pakistan, Bangladesh and India by utilizing RCA index from 1980-2010 and concluded that Pakistan enjoyed a highest CA over India and Bangladesh in textile sector. The results also indicate that India faced a comparative disadvantage over Pakistan and Bangladesh, while Bangladesh had a CA over Pakistan and India in clothing sector. Irshad and Xin (2017) conducted a study to examine determinants of exports competitiveness of Pakistan in the world market. A gravity model was employed by Irshad and Sofia (2019) to examine the determinants of Pakistan's bilateral trade and trade potential with global market. Krisiukeniene and Pilinkiene (2020) examined the exports competitiveness of creative industries in EU countries from 2004-2017. The findings of the analysis portray that France, Poland, Slovakia, Slovenia and Spain had faced CA in

creative industries. Danna-Buitrago and Stellian (2021) proposed a new class of RCA indexes based on a critical review of the three RCA indexes in Vollrath (1991). The new class of RCA indexes gives second-best solutions for temporal stationarity and acceptable RCA index distributional properties. Several indices of RCA were applied by Maqbool et al. (2018) to measure the CA of Pakistan's leather sector exports to the world market and concluded that Pakistan enjoyed comparative advantage in this sector. Usman et al. (2021) measured the effect of J-Curve on trade between United Kingdom and Pakistan by using commodity trade data. Noor et al. (2023) examined the determinants of leather exports of Pakistan by using Gravity model during 1990-2010. The purpose of current study is to inspect the export performance and CA of Pakistan's leather exports to EU-27 and American economies by employing RCA, SRCA, REA, Vollrath index, TBI, ARCA and NRCA indices during 2004-2021. There is no relevant study in the literature that employed all of these RCA indices to analyze the competitiveness of Pakistan's leather export sector in the American and EU-27 economies between 2004 and 2021. The current study adds significance to the topic of measuring Pakistan's leather sector's competitiveness in the EU-27 and American economies. The intended study will be useful for stakeholders involved in Pakistan's leather business in developing better policies to foster the export of leather goods. It will also benefit as a location factor for public and government investment-friendly trade transactions.

Data and Methodology: There are numerous methodologies and methods for measuring competitiveness based on theoretical foundations. This study is founded and centred on Balassa's measurement of revealed comparative trade advantage (RCA) and other indices of revealed comparative advantage, which employs the Ricardian trade theory. This research obtained the data from International for leather exports to EU-27 and American economies during 2004-2021.

Balassa Index: Balassa (1965) presented the idea of comparative advantage, and the basic model of Balassa index is as follows:

$$BI = \frac{X_i^t / \sum X_i^t}{X_i^w / \sum X_i^w}$$

Where, X_i^t = Leather exports of concerned economy, $\sum X_i^t$ = Country's total exports to the selected region, X_i^w = Regional leather exports and $\sum X_i^w$ = Total exports of the region.

Relative Export Advantage Index: The current study employed Relative Export Advantage (REA) index to examine the export competitiveness of Pakistan in selected region. If REA>0 showing comparative advantage, while negative REA values portrays comparative disadvantage of Pakistan in leather sector (Maqbool and Sofia, 2018). The REA is explained as follow.

$$REA = Ln(RCA)$$

Symmetrical Revealed Comparative Advantage index (SRCA): The SRCA is employed to control the skewness issue, and it is explained as follows.

$$SRCA = \frac{BI - 1}{BI + 1}$$

Vollrath Index (RCA#): Vollrath (1991) proposed the CA index, which is a superior gauge of measuring competitiveness as it eradicates the problem of double-counting in global trade.

$$RCA\# = \frac{\left\{\frac{s_{ij}}{(\sum_i s_{ij}) - s_{ij}}\right\}}{\left\{\frac{(\sum_j s_{ij}) - s_{ij}}{[(\sum_j \sum_i s_{ij}) - (\sum_j s_{ij})] - [(\sum_i s_{ij}) - s_{ij}]}\right\}}$$

Where, S_{ij} = Country's Leather exports, $\sum_i S_{ij}$ = Country's total exports to the region, $\sum_j S_{ij}$ = Region's leather exports and $\sum_j \sum_i S_{ij}$ = Region's total exports.

Normalized Revealed Comparative Advantage Index: The index of Normalized Revealed Comparative Advantage (NRCA) has some advantages and it is used as a more appropriate measure for compare and changes of CA over time (Yu *et al.*, 2009).

This index is explained as the following.

$$NRCA_i^j = \frac{x_i^j}{\sum_i x_i^W} - \frac{x_i^W * \sum_i x_i^j}{(\sum_i x_i^W)^2}$$

Where: *X* denotes the exports; *j, i* and *w* signify, respectively, the country analyzed, the commodity or sector analyzed and the selected area of reference.

The first part of current equation highlights the relationship between the exports of product i by country j in comparison with the selected area of reference. The second portion of this equation represents the CA neutral situation, explained by the exports of product i in the selected reference area multiplied by total exports of all products by country j. The denominator of second portion is the square of the total exports of the reference area. If NRCA> 0 shows the comparative advantage in the concerned sector, while NRCA<0 represents comparative disadvantage.

Additive Revealed Comparative Advantage Index (ARCA): The additive RCA index explains the comparative advantage and comparative disadvantage of the country's exports in the world. If ARCA is greater than zero represents CA, whereas ARCA<0 shows comparative disadvantage. This index corrects asymmetry of Balassa index and it allows comparing different commodities as well.

$$ARCA_i^j = \frac{X_i^j}{\sum_i X_i^j} - \frac{X_i^W}{\sum_i X_i^W}$$

Where, X_i^j = Pakistan's leather exports to selected economy/region, $\sum_i X_i^j$ = Pakistan's total exports to selected economy/region, $\sum_i X_i^W$ = Total exports of selected region, X_i^W = Total leather exports of selected region

Trade Balance Index (TBI): Furthermore, the current research utilized the TBI to determine whether an economy

specializes in leather exports (as a net exporter) or leather imports (as a net importer) for a given group of products. Lafay (1992) used TBI to investigate the asses CA.

$$TBI = X - M/X + M$$

RESULTS AND DISCUSSIONS

This study's objective is to assess the export competitiveness of Pakistan's leather sector in the EU-27 and U.S. economies from 2004 to 2021, using numerous indices of revealed comparative advantage.

Table 1 highlights the various indices of RCA of leather sector exports to EU-27 economies from 2004-2021. The findings of RCA index reveal that Pakistan faced a high CA during 2004-21 in concerned economies. This finding shows that Pakistan had a high level comparative advantage in the leather sector up to 2021, with RCA values larger than 4 (Shahab and Mahmood, 2013); nevertheless, the trend was fading. The results of SRCA index explain the comparative advantage of Pakistan. In addition, the REA index reveals that the economy of Pakistan faced a CA in the leather exports of Pakistan (Maqbool *et al.*, 2022). A competitive advantage was observed in the leather exports of Pakistan by employing Vollrath index (Maqbool *et al.*, 2018). The global financial crisis of 2008-09 had a significant influence on global trade. The World Trade Organization recorded a 12% decrease in global trade volume in 2009. The drop-in trade channels caused by the financial collapse reduced demand for trading commodities and created a trade financing shortage (WTO,

2010). The average decreasing trend of these indices was caused by regional currency depreciation, high energy costs, low wages, poor government policies, high tax rates, energy crisis, unavailability of raw materials, high operating costs, low labour productivity, low technology, the country's law and order situation, and the global financial crisis.

Normalized Revealed Comparative Advantage (NRCA) index is applied to measure the CA in the leather sector. The findings of NRCA index illustrates that Pakistan faced a CA in this sector in the EU-27 countries during 2004-2021. The positive ARCA index represents comparative advantage during the selected time span in EU-27 markets. Moreover, the current study also employed TBI to examine the specialization of the selected economy to the region. The findings of TBI portrays that Pakistan is the net-exporter in the leather sector in EU-27 economies.

Table 2 highlights the results of different indices of Revealed Comparative Advantage. The RCA index shows that Pakistan faced a high comparative advantage in the leather sector in American economies from 2004-2021, because the RCA index is greater than 4. The SRCA index represents the CA in the concerned sector during selected time span (Shahab and Mahmood, 2013). Moreover, the comparative and competitive advantage was observed in this sector by using REA and Vollrath index (Maqbool *et al.*, 2018). The positive values of NRCA index describe the CA of leather sector in American economies. In addition, ARCA index also confirmed that Pakistan was enjoyed high comparative advantage in this

Table 1. Various RCA indices of Leather exports of Pakistan to EU-27 economies during 2004-2021 (US$000)

Years	RCA	SRCA	REA	RCA#	NRCA	TBI	ARCA
2004	22.14984	0.91361	3.09783	24.2711	0.000061176	0.998850	0.06988
2005	24.24947	0.92079	3.18839	26.8649	0.000072760	0.993562	0.07664
2006	23.62187	0.91877	3.16217	26.0112	0.000064445	0.996251	0.07305
2007	24.23863	0.92076	3.18795	26.7794	0.000061513	0.994670	0.07755
2008	27.59191	0.93005	3.31752	30.9557	0.000069199	0.995159	0.08959
2009	24.81216	0.92252	3.21133	27.8036	0.000073836	0.988713	0.08924
2010	24.30043	0.92095	3.19049	27.1123	0.000074815	0.989838	0.08442
2011	21.02658	0.90920	3.04579	23.1507	0.000069178	0.974260	0.07409
2012	22.92379	0.91640	3.13218	25.4943	0.000067675	0.986284	0.08432
2013	21.65229	0.91171	3.07511	24.0528	0.000076646	0.985559	0.08158
2014	18.11562	0.89537	2.89677	19.9219	0.000078055	0.991415	0.07340
2015	15.52929	0.87900	2.74273	16.9609	0.000077757	0.994118	0.06867
2016	13.64709	0.86345	2.61353	14.7727	0.000073623	0.993519	0.06164
2017	12.45370	0.85134	2.52202	13.3537	0.000063805	0.987825	0.05435
2018	12.02219	0.84642	2.48675	12.8334	0.000057451	0.995689	0.05116
2019	10.47500	0.82571	2.34899	11.1130	0.000055799	0.992834	0.04621
2020	11.71056	0.84265	2.46049	12.4374	0.000056532	0.994153	0.04547
2021	11.42610	0.83905	2.43590	12.0616	0.000048816	0.994090	0.04038

Sources: Authors own calculations.
*Revealed Comparative Advantage (RCA), Symmetrical Comparative Advantage (SRCA), Normalized Revealed Comparative Advantage (NRCA), Relative Export Advantage (REA), Trade Balance Index (TBI), Vollrath index (RCA#) and Additive Revealed Comparative Advantage (ARCA).

Table 2. Numerous Indices of RCA of Leather exports of Pakistan to American economies during 2004-2021 (US$000).

Years	RCA	SRCA	REA	RCA#	NRCA	TBI	ARCA
2004	6.459162	0.731873	1.865500	6.685309	0.00003812	0.998273	0.025800
2005	5.478376	0.691281	1.700809	5.635414	0.00003499	0.996240	0.020082
2006	5.666565	0.699995	1.734583	5.830359	0.00003433	0.992044	0.020183
2007	5.729064	0.702782	1.745552	5.888835	0.00002919	0.988083	0.020366
2008	7.478939	0.764121	2.012091	7.744481	0.00003295	0.986085	0.026209
2009	6.973959	0.749184	1.942183	7.221052	0.00003693	0.987450	0.025695
2010	5.983466	0.713609	1.789000	6.156882	0.00002936	0.987368	0.021322
2011	6.937573	0.748034	1.936952	7.166014	0.00003003	0.982905	0.024698
2012	7.568118	0.766576	2.023944	7.850790	0.00003246	0.981330	0.028600
2013	7.643113	0.768602	2.033805	7.943593	0.00003482	0.991770	0.030226
2014	7.663578	0.769148	2.036479	7.966567	0.00003369	0.990253	0.030782
2015	7.459599	0.763582	2.009502	7.768532	0.00003749	0.994010	0.032309
2016	7.408861	0.762156	2.002677	7.702461	0.00003505	0.994907	0.030877
2017	7.313767	0.759435	1.989758	7.587422	0.00003206	0.988525	0.029154
2018	7.885272	0.774908	2.064997	8.202957	0.00003408	0.993918	0.031278
2019	8.354993	0.786210	2.122859	8.709787	0.00003754	0.991900	0.032266
2020	9.543103	0.810303	2.255819	9.955578	0.00003933	0.990941	0.030642
2021	8.187428	0.782311	2.102600	8.509331	0.00004071	0.991421	0.027213

Sources: Authors own calculations.
* Revealed Comparative Advantage (RCA), Symmetrical Comparative Advantage (SRCA), Normalized Revealed Comparative Advantage (NRCA), Relative Export Advantage (REA), Trade Balance Index (TBI), Vollrath index (RCA#) and Additive Revealed Comparative Advantage (ARCA).

sector during 2004-2021. The findings of TBI portrays that Pakistan is the net-exporter in the leather sector in American economies.

Conclusion: This research aims at to investigate the export competitiveness of Pakistan's leather sector in EU-27 and American economies. The data were taken from International Trade Center for leather exports during 2004-2021. The current analysis applied RCA, REA, SRCA, Vollrath index, TBI, NRCA and ARCA indices of revealed comparative advantage to analyze the export performance and competitiveness. The findings of RCA, REA, SRCA and Vollrath index portrays that Pakistan enjoyed a high CA in this sector in American and EU-27 economies. The positive values of NRCA index describe the CA of leather sector in American economies and EU-27 countries. In addition, ARCA index also confirmed that Pakistan was enjoyed high comparative advantage in American and EU-27 economies in this sector during 2004-2021. According to the findings of this study, Pakistan need to further specialize in leather processing by decentralizing the industry to different regions and should improve the quality of leather products by using modern technology to enhance the market share in EU-27 and American economies. There is a dire need to boost the leather sector's comparative and competitive advantage through policy support and facilitation by all stakeholders in order to achieve growth in the livestock and agriculture sectors and increase the income of connected stakeholders.

REFERENCES

Ahmad, N. and R. Kalim. 2013. Changing revealed comparative advantage of textile and clothing sector of Pakistan: Pre and post quota analysis. Pakistan Journal of Commerce and Social Sciences 7:534-558.

Akhtar, W., N. Akmal, H. Shah, M.A. Niazi and A. Tahir. 2013.Export competitiveness of Pakistani horticultural products. Pakistan Journal of Agricultural Research 26.

Anwar, S., Z. Hussain and M.S. Javed. 2005. Comparative advantage and competitiveness of wheat crop in Pakistan. The Lahore Journal of Economics 10:101-110.

Balassa, B. 1965. Trade liberalisation and 'revealed' comparative advantage.pp. 99-123

Czifra, V. 2006. The Competitiveness of the Hungarian Agri-Food Sector: From Transition to Accession. Department of Economics, Uppsala University.

Danna-Buitrago, J.P. and R. Stellian. 2021. A New Class of Revealed Comparative Advantage Indexes. Open Economies Review. pp.1-27.

Erkan, B. 2014. Comparative Analysis of the Competitiveness in the Export of Science-Based Goods Regarding Turkey and the EU+ 13 Countries. International Journal of Business and Social Science 5.

Hoen, A.R. and J. Oosterhaven. 2006. On the measurement of comparative advantage. The Annals of Regional Science 40:677-691.

Irshad, M.S. and Q. Xin. 2017. Determinants of exports competitiveness: An empirical analysis through revealed comparative advantage of external sector of Pakistan. Asian Economic and Financial Review 6:623-633.

Irshad, M.S. and S. Anwar. 2019. The determinants of Pakistan's bilateral trade and trade potential with world: A gravity model approach. European Online Journal of Natural and Social Sciences.

Khatibi, A. 2008. Kazakhstan's revealed comparative advantage vis-a-vis the EU-27. ECIPE Working paper.

Krisiukėnienė, D. and V. Pilinkienė. 2020. Export competitiveness analysis of creative industries in the European Union. Economics and Culture 17:28-37.

Lafay, G. 1992. The measurement of revealed comparative advantages, in M.G. Dagenais and P.A. Muet (eds.), International Trade Modeling, Chapman & Hill, London.

Lgnjatijević, S., M. Čavlin and D. Đorđević. 2014. Measurement of comparative advantages of processed food sector of Serbia in the increasing the export. Economics of Agriculture 61:677-693.

Lorde, T., B. Francis and A. Alleyne. 2009. Examining Export Performance in CARICOM from 1992-2006: An Application of the Revealed Comparative Advantage Measure. http://www. ccmfuwi. org/files/publications/conference/1022. pdf.

Maqbool, M.S., A.A. Shahzad, K. Zahra and R. Bano. 2022. Implications of Export Performance and Competitiveness in Leather Sector of Pakistan: An Empirical Investigation. Pakistan Journal of Social Sciences 42:23-32.

Maqbool, S. and S. Anwar. 2018. Competitiveness and Comparative Advantage of Pakistan in Leather and Leather Products Trade: Analysis and Trends. European Online Journal of Natural and Social Sciences.pp.244.

Mizik, T., A. Szerletics and A. Jámbor. 2020. Agri-Food Export Competitiveness of the ASEAN Countries. Sustainability 12:9860.

Mousavi, S.Z. and S. Rasekhi, M. Golestani and A. Imani. 2018. Studying international competitiveness in pharmaceutical sector in selected developed countries. Asian Journal of Pharmaceutical and Clinical Research 11:451-460.

Noor, F., A.N. Bhutta and I. Farooq. 2023. The Determinants of Leather Exports of Pakistan: A Gravity Panel Approach. Journal of Applied Economics and Business Studies 7:47-66.

Oduro, A.D. and E.L. Offei. 2014. Investigating Ghana's revealed comparative advantage in agro-processed products. Modern Economy.

Sachithra, K.M.V. G.A.C. Sajeevi, M.P.K Withanawasam and W.M.S.A. Jayathilake.2012. Comparative advantage in international trade: a study based on leading exports in Sri Lanka. Selected Asian Economies. International Journal of Economics and Financial Issues 3:133.

Shahab, S. and M.T. Mahmood. 2013. Comparative advantage of leather industry in Pakistan with selected Asian economies. International Journal of Economics and Financial Issues 3:133-139.

Shahzad, K. 2015. An RCA analysis of textiles and clothing in Pakistan, India, and Bangladesh. The Lahore Journal of Economics 20:157.

Sofia, A. 2004. Comparative advantage and competitiveness of major agricultural crops in indus basin: price risk analysis. Doctoral Dissertation, University of Agriculture Faisalabad, Pakistan.

Usman, A. M. Bahmani-Oskoee, S. Anwar and S.A.N.A. Ullah. 2021. Is there j-curve effect in the trade between Pakistan and United Kingdom? Asymmetric evidence from industry level data. The Singapore Economic Review.pp.1-21.

Vollrath, T. L. 1991. A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. Weltwirtschaftliches Archiv 127:265-280.

Widodo, T. 2009. Comparative advantage: theory, empirical measures and case studies. Review of Economic and Business Studies.pp.57-82.

WTO. 2010. Trade to Expand by 9.5% in 2010 After a Dismal. 2009. WTO Reports. WTO Press.

Yu, R. J. Cai and P. Leung. 2009. The normalized revealed comparative advantage index. The Annals of Regional Science 43:267-282.