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Empirical Investigation of Pakistan's Export Potential Using Normalized Revealed Comparative Advantage (NRCA) and Product Mapping (PM)

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ABSTRACT
The trade deficit has always been one of the major critical problems of Pakistan. Despite various policies and measures adopted in the past, this chronic problem is still creating a source of instability in the economy. This paper attempts to analyze commodities having comparative advantage and identify potential exports products in case of Pakistan. The study uses data relating to export and import of all SITC (Standard International Trade Classification) commodities at three-digit level at three points of time i.e. 2000, 2014 and 2015. For empirical consideration, normalized revealed comparative advantage and product mapping techniques are applied. The study pinpoints that Pakistan's revealed comparative advantage comprises of primary products and unskilled labor intensive products. Similarly, this study also identifies commodities having export potentials which will help to enhance Pakistan's export and will reduce the trade deficit.

JEL classification: F11; F14
KEYWORDS: Normalized Revealed Comparative Advantage, Product Mapping, Export Potential, trade Deficit, Pakistan.

I. INTRODUCTION

It is widely accepted argument among economists that export is the major and sustainable source of foreign exchange earnings for a country. It is observed that export-based industries have substantial component in GDP, major source of employment, incentives of manufacturing sector and promotion of industries. All of these lead to better standard of living. These export-based industries are crucial drivers of gross domestic product of any country. Unfortunately, Pakistan's export performance is not favorable enough to achieve self-sustaining condition in view of foreign exchange reserves. For this unsatisfactory performance, there are many factors governing the issue and need serious attention towards unfavorable growth of export.

1.1 Examining exports and import trends of Pakistan

Historical data relating to exports and imports of Pakistan underlined the fact that over the years, exports of Pakistan has been less than imports and thus creating a chronic trade deficit. It highlights that Pakistan's export shows poor performance throughout the sample period. Moreover, in comparison to other developing countries and regional countries, the performance of exports of Pakistan is disappointing in terms of both volume and growth. The position became worst from 2005 onwards as trade deficit has increased alarmingly. Data on trade of Pakistan shows that from 1985-86 export increased from $3070 million to $ 23667 million in 2014-15. Whereas, import has increased from $5634 million to $45826 million, which confirms that the increase in export is less than import see figure 1.

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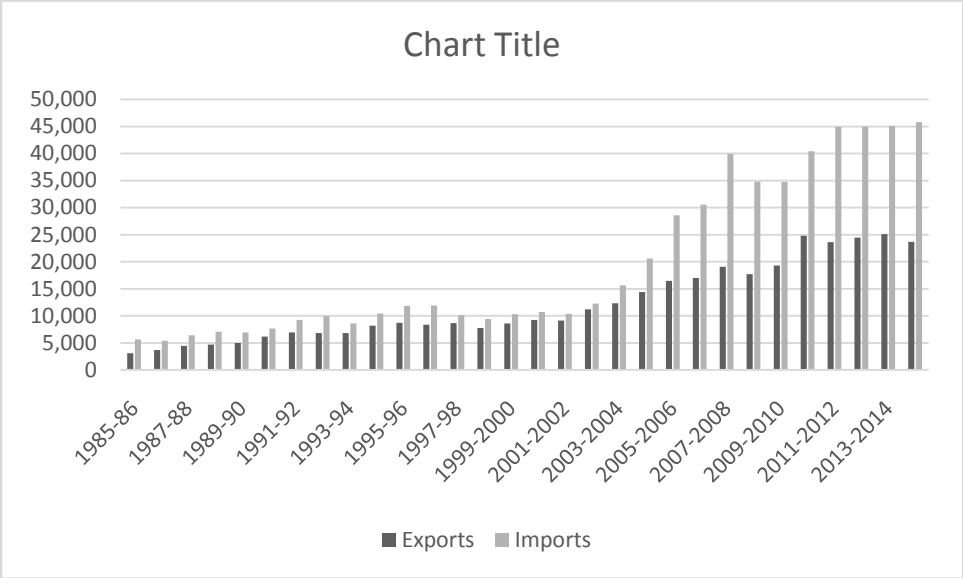
Figure 1 export vs import of Pakistan (in Million US$)



Source: authors' construction

1.2 Pakistan's export structure and export direction

From 2010 to 2014, Pakistan exports 2877 commodities among 199 trading partners. However, it is a fact that Pakistan's exports are concentrated among few commodities. Data shows that Pakistan's textile and clothing products comprise largest share in exports, followed by vegetables and food products. Exports of Pakistan have never been broad-based, but few categories account for nearly 90 percent of total exports. The current scenario of Pakistan's export structure is presented in the table 1. The scenario is disappointing because all groups show a declining trend as compared with previous year. In case of food group, all items values are declining except spices (17.8%), meat and meat preparation (16.8%). Textile manufactures also shows a declining trend of -8.2%. In this group towels and readymade garments growth increases by 0.2% and 4.2% respectively. Similarly, petroleum group, other manufactures and all other item groups exhibit a declining trend by -74%, -16% and -25% respectively (see Table 1). From 2010 to 2015, Pakistan exports with 199 partners. However, Pakistan's export is concentrated among few partners. Pakistan's export to USA is 16 percent, with china 10 percent, with UK 7 percent and with Afghanistan 8 percent. By decomposition of exports by country exhibits that almost 59 percent of trade of Pakistan is with 10 partners. Whereas, almost 41 percent, exports are with remaining partners.

Table 1: Structure of Exports US$(Million)

Particulars	2014-15	2015-16 P*	% change in values
Food group	3,439.4	3,040.7	-11.6
Textile manufactures	10,194.8	9,363.6	-8.2
Petroleum group	510.4	128.9	-74.7
Other manufactures	2,851.9	2,385.2	-16.4
All other items	924.7	687.8	-25.6

Source: Economic survey of Pakistan, July-March, *provisional

II. LITERATURE REVIEW

Shah et al. (2009) measured the performance of selected Pakistani fruits by comparing it with other major international fruits exporters. The Methodology of the study is based on Balassa and other different RCA indices by considering period from 1995 to 2005. It found out that Pakistan's comparative advantage is stronger in dates and mangoes whereas, the study

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highlighted with lower comparative advantage in term of oranges except USA.

Mahmood and Hajji (2009) studied nonpetroleum sector of Kuwait using Revealed Comparative Index. Kuwait increases its comparative advantage in commodities other than manufactured products, machinery and transport. The study divided products into six main categories such as food, beverages and tobacco, live animals, crude materials, manufactured articles and chemicals. It found that Kuwait's nonpetroleum items have emerged due to international market competitiveness.

Ghani et al. (2008) studied the competitiveness of Pakistan's footwear industry. The study, based on Balassa's revealed comparative advantage index, considered commodities at two-digit and four-digit level of HS classification from 1996 to 2006. This study established that Pakistan's RCA has improved since 2003 and constantly increasing during the period of analysis. The study also compared Pakistan's competitiveness in terms of RCA with India and China and found that latter competitiveness declined since 2001. The study also explored favorable growth in three commodities at 4-digit level.

Hanif and Jafri (2006) analyzed Pakistan's textile sector by calculating Revealed Comparative Advantage (RCA) index proposed by Balassa. This study has attempted to solve the hypothesis that textile export competitiveness of Pakistan can be enhanced by providing easy access to external finance. The result of the study highlighted that there is a positive association between access to external finance and competitiveness of Pakistan's textile sector.

Mahmood (2005) has conducted a study based on RCA technique to inspect specialization in export of Pakistan's non-agriculture sector from 1990 to 2000, using HS 4-digit level. This study identified competitiveness in non-agriculture production sectors by allocating them in terms of losing, gaining or maintain their competitiveness.

Utkulu and Seymen (2004) conducted sector level study of Turkey using different RCA indices for robustness and confirmation of the findings from 1990-2003. They concluded that Turkey has comparative advantage in only seven product groups, namely vegetables and fruits, clothing, honey, sugar, oil seeds, tobacco, and textile yarn out of 63 product groups.

III. METHODOLOGY AND DATA

3.1 Normalized Revealed Comparative Advantage

It was the valuable contribution of Balassa who constructed an index to measure the competitiveness of a country in a particular commodity. It is commonly used index in international trade theory, however the interpretation of this index can be vague. In this connection, Havrila and Gunawardana (2003) drew attention towards the weak points of RCA constructed by Balassa that using post-trade observations and circuitousness of the RCA index, causes the problem of interpretation. Similarly, Yeats (1985) and Hillman (1980) proclaimed that by using Balassa proposed index (BRCA) we can only theoretically indicate the commodity's comparative advantage because BRCA index has neither ordinal nor cardinal property. A Study conducted by (Hinloopen and Marrewijk (2001) and Yu et al. (2009), explained that BRCA index has asymmetric property. Furthermore, the study of Hoen and Oosterhaven (2006) emphasized that due to its dependency on number of countries and sectors, it is impossible from the theoretical point of view to originate the standard multiplicative RCA index. It is also indicated by the study conducted by Yeats (1985) that bilateral revealed comparative advantage index is particularly sensitive for smaller countries. This study does not utilize the BRCA index due to the problematic nature of sensitivity to smaller economies.

Yu et al. (2009) formulated an index named normalized revealed comparative advantage (NRCA) which give another way to researchers to evaluate comparative advantage dynamically rather than statically. This modified index has the advantage of having of cardinal property that the BRCA index does not hold. Due to cardinal nature, of NRCA, it becomes possible to relate degrees of comparative advantage between time periods in addition to between products. This index computes the degree to which actual export of a country of interest is deviating from its level of neutral comparative advantage point in terms of its relative scale relating to the world market. Furthermore, other important features include in NRCA are property of symmetrical distribution and independence to number of countries and sectors. Hence, the present study utilizes the NRCA index due to its technical and statistical advantages over BRCA. NRCA index can be calculated as follows:

$$\mathbf{NRCA_{ik} = (E_{ik} / E) - (E_k E_i / EE)}$$

Where, $NRCA_{ik}$ is NRCA index of the country i for product k, E_{ik} shows product k's export from country i, E_k represents total world export of product k, and E_i represents total export from country i, E represents total world export in

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this equation. If $NRCA_{ik}$ is positive, this indicates that actual export of the country i's of product k is above than its level of neutral comparative advantage, referring that country i has comparative advantage in exporting product k. Similarly, if the value is negative, it shows that country i has comparative disadvantage in case of product k. It is mentioned above that values of NRCA have symmetrical distribution, its value ranging from −1/4 to +1/4 and 0 value shows the commodity is at comparative advantage neutral point. The section 4 of this paper validates the suitability of the NRCA index in evaluating competitive power of commodities for export by relating the relative ranking as well as relative export share of commodities in the export basket.

3.2 Product mapping

Proposed by Widodo (2008), this technique can be used for dynamic analysis of comparative advantage. To analyze comparative advantage of East Asian countries, Widodo used the trade balance index (TBI) and revealed systematic comparative advantage (RSCA) to construct the product map. Lafay (1992) proposed TBI index to examine whether a country is a net-exporter of particular commodity groups or net-importer of particular commodity groups. If the country is net exporter, its shows country's export specialization in particular commodity groups, which are usually classified according to SITC. TBI is formulated as follows

$$\mathbf{TBI_{ik} = (X_{ik} - M_{ik}) / (X_{ik} + M_{ik})}$$

.

Where,

$\mathbf{TBI_{ik}}$: Trade balance index of country i for product group k

$\mathbf{X_{ik}}$: Export of country i for product group k

$\mathbf{M_{ik}}$: Import of country i for product group k

TBI takes the value, ranging from -1 to +1. If TBI equal to +1, this shows a country only export (net exporter). If TBI equal to -1, highlights that a country only import (net importer).

The present study employs the product mapping model and using NRCA and TBI in order to explore the dynamic changes of comparative advantage in case of Pakistan. In this connection, figure 2 represents a further description of product mapping. Based on these two indexes, this figure represents the classification of products according to product mapping. The products are divided into four groups. Group A consists of values with NRCA>0 and TBI>0. Products in this group are most vital due to strong competitive power and strengthen the balance of payment of a country. On the contrary, group D consists of values with NRCA < 0 and TBI < 0 which shows that commodities are not competitive enough to beat global competition and also creates balance of payment deficit. Similarly, group B comprises of values with NRCA > 0 but TBI < 0, shows the country has comparative advantage but lack in export specialization. On the other hand, values of group C show country's lack of competition but has export specialization. The commodities which are included in groups B and C are considered as "potential products" but requires different strategies about resource allocation in different time periods

Figure 2: product mapping representation

Group B Comparative advantage and net-importer (NRCA>0, TBI<0)	Group A Comparative advantage and net-exporter (NRCA>0, TBI>0)
Group D Comparative disadvantage and net-importer (NRCA<0, TBI<0)	Group C Comparative disadvantage and net-exporter (NRCA<0, TBI>0)

Source: authors' construction

3.3 Data and classification of industries

Present study utilizes Standard International Trade Classification (SITC) Rev.3 commodities at three digit level. There are 204 SITC commodities at three digit level are included in this analysis at three time periods i.e. 2000, 2014 and 2015. Complete list of commodities is presented in appendix. These commodities comprise almost more than 90 percent of total exports of Pakistan. Greenaway and Milner (1986) suggested that the three digit SITC commodities are favorable for analysis due to the reason that

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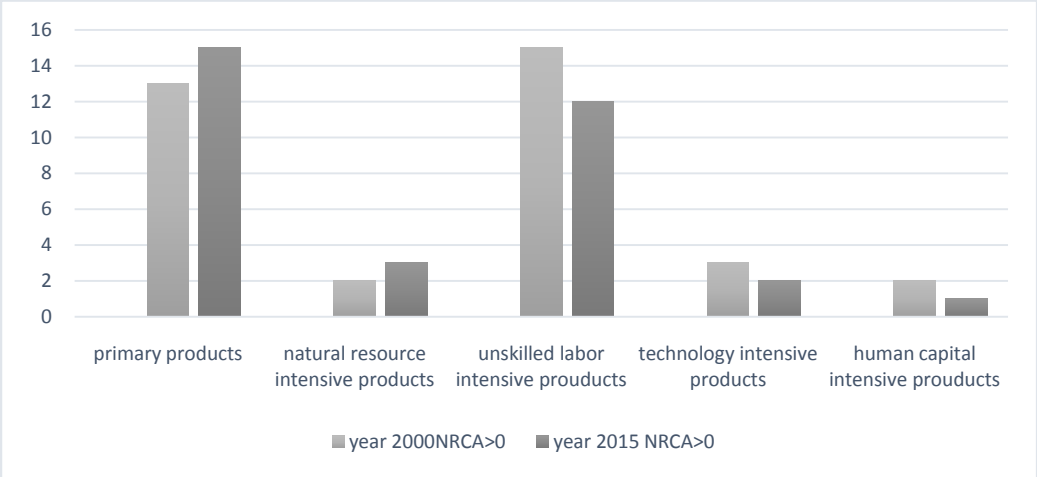
these commodities are produced using alike elements and production technologies across different countries. Furthermore, the study categorizes the commodities into five main types of industries classified by ETA (Empirical Trade Analysis). Appendix reports this classification of industries at the end of the paper.

IV. RESULTS AND DISCUSSION

4.1 Patterns of Revealed Comparative Advantage

This section explains the mechanism and findings to identify number of commodities which have comparative advantage in case of Pakistan. The results show that in the year 2000-01, there are total 37 commodities which have comparative advantage. In 2014-15, the comparative advantage decreases to 35 commodities. The rest of our trading partners are more competitive than us. The analysis further decompose the commodities into five main types of industries, namely primary products, natural resource-intensive products, unskilled labor-intensive products, technology-intensive products and human capital-intensive products. This decomposition is based on ETA, Empirical Trade Analysis. Figure 3 gives the picture showing the comparative advantage in different industries. It is highlighted from figure 3 that by considering two points of time i.e. 2000 and 2015, commodities having comparative advantage increases in case of primary products industry. The graph also highlighted that commodities relate to the group of natural resource intensive products shows a slight increase in commodities having comparative advantage. Similarly, in case of unskilled labor intensive products industry, technology intensive products industry and human capital intensive products industry, the number of competitive products decreases. Figure 3 also explore that Pakistan's comparative advantage primarily consists of primary products and unskilled labor intensive products.

Figure 3: industry wise representation with NRCA>0



Source: authors' calculation and construction

Table 2.1 and 2.2 represent the competitive advantage of major products with their relative importance by showing their share in total export of Pakistan. These commodities constitute more than 90 percent of Pakistan's total exports. Table 2.1 highlighted that exports of Pakistan is concentrated in commodities (code) 658, 652, 042, 651, 841, 843, 842, 848, 845, 611, 661, 846, 057 (for commodities' name see table). Similarly, commodity 658 share in total export increases from 14.72 in 2000 to 15.63 in 2014, increase by nearly 1 percent and further increases to 16.8% in 2015. Commodity 652 share decreases from 11.66 in 2000 to 10.41 in 2014 and slightly increases to 10.5% in 2015. Commodity 042 shows a significant favorable change, its share increases from 5.80 in 2000 to 8.90 in 2014 and slightly decreases to 8.7 % in 2015. However, commodity 651 decreases from 12.92 to 7.92 from 2000 to 2014 and 7.2% in 2015. Commodity 841 share decreases from 5.87 to 4.78 and increases to 5.6% in 2015. Commodity 843 share also decreases from 5.58 to 4.7 percent in 2015. Commodity 842 share in total export showing an increasing trend from 1.44 to 3.6 percent in 2015. Share of commodity 848 has decreased from 4.34 to 2.44 percent. Moreover, share of commodities 845, 894, 659, 263, 611 in total export have decreased significantly. However, commodities which increase their share in total export are 222, 821,

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512, 661, 75, 696,657, 431, 62, 897, 292, 851, 574, 54, 542, 34, 333, 61, 57, 334, 844, 872, 842, and 846. These facts show that Pakistan's exports are not genuinely becoming more diversified but there is some changes in here and there and the speed of diversification is low. The good indicator is that new commodities are able to improve their share in total export of the country from 2000 to 2015.

Table 2.1: Export share of commodities

Commodity code	NRCA for 2000*	commodity's export share in 2000	NRCA for 2014*	commodity's export share in 2014	commodity code	NRCA for 2000*	commodity's export share in 2000	NRCA for 2014*	commodity's export share in 2014
658	19.05	14.72	19.59	15.64	334	-2.16	0.62	-10.11	1.72
651	16.39	12.92	7.57	7.92	57	0.71	0.93	0.57	1.72
652	14.93	11.66	10.48	10.42	61	0.52	0.54	1.02	1.41
841	6.95	5.87	4.08	4.78	333	-5.57	0.80	-10.23	0.90
42	5.25	5.80	8.97	8.90	34	0.20	0.45	0.20	0.98
843	7.14	5.58	4.20	4.40	542	-0.93	0.37	-3.72	0.74
653	6.69	5.53	1.08	1.62	54	0.09	0.34	-0.15	0.62
848	5.45	4.34	2.12	2.44	574	-0.06	0.22	-0.09	0.59
845	3.30	3.39	0.61	2.37	851	-0.28	0.45	-1.23	0.53
894	3.13	3.07	0.30	1.48	292	0.26	0.40	0.02	0.53
659	3.87	3.07	0.31	0.50	897	-0.08	0.26	-1.64	0.48
263	2.82	2.24	0.87	1.02	431	0.27	0.25	0.32	0.47
611	2.61	2.22	1.97	2.21	62	0.04	0.09	0.26	0.40
846	1.81	1.56	1.76	2.08	657	0.19	0.46	-0.23	0.40
842	1.09	1.44	1.87	2.95	696	0.29	0.29	0.20	0.35
872	1.29	1.36	0.10	1.38	75	0.17	0.17	0.14	0.26
844	1.15	1.12	0.43	1.17	661	-0.19	0.01	1.85	2.16
334	-2.16	0.62	-10.11	1.72	512	-0.16	0.07	0.89	1.41
57	0.71	0.93	0.57	1.72	821	-1.07	0.06	-1.84	0.39
61	0.52	0.54	1.02	1.41	222	-0.19	0.05	-0.74	0.27

Source: authors' calculation, * to facilitate discussion, NRCA values were rescaled by a constant value of 1, 000, 00

Table 2.2: Export share of commodities

Commodity code	NRCA 2015*	Export share 2015	Commodity code	NRCA 2015*	Export share 2015
42	13.42	8.72	34	1.08	1.04
57	2.03	1.88	54	0.95	1.00
61	1.73	1.30	57	2.03	1.88
263	0.96	0.68	61	1.73	1.30
334	0.25	0.39	62	0.44	0.36
611	2.98	1.92	75	0.43	0.32
651	10.93	7.28	222	-0.42	0.18
652	16.33	10.52	292	-0.09	0.32
653	1.73	1.31	333	-4.31	0.80
658	26.03	16.85	334	0.26	0.39
659	0.44	0.48	431	0.04	0.27
841	8.56	5.65	512	1.67	1.40

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842	5.18	3.66	542	0.59	0.91
843	6.16	4.77	574	0.78	0.54
844	1.46	1.13	657	0.71	0.56
845	4.02	2.78	661	2.14	1.63
846	2.40	2.32	696	-0.94	0.37
848	3.03	2.43	821	0.01	0.42
872	0.56	1.59	851	-0.23	0.53
894	1.95	1.54	897	-0.86	0.06

Source: authors' calculation, * to facilitate discussion, NRCA values were rescaled by a constant value of 1, 000, 00

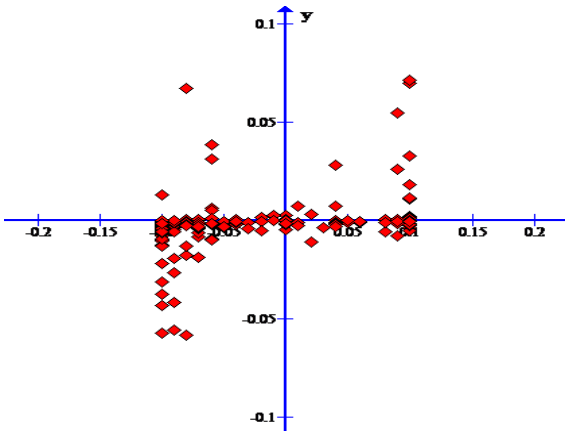
4.2 Product mapping

Figures 4, 5 and 6 represents product mapping of a basket of Pakistan's export by considering three points of time i.e. 2000, 2014 and 2015. By using this technique, the study reveals that in the year 2000 there are 22 products are in the group A with NRCA > 0 and TBI > 0. This group represents that Pakistan has comparative advantage in these products and also the net exporter of these commodities. However, these commodities are only 11 percent of total commodities. The study highlights that in 2000 there are few commodities which played the role of strengthening Pakistan's balance of payment. Similarly, the study reveals that group D with NRCE < 0 and TBI < 0 comprises of 136 commodities. These commodities are not only lack of competiveness in the global market, but also responsible for creating the trade deficit problem in the balance of payment. This group contains 67 percent of total commodities. In the year 2000 more than 50 percent of commodities are accountable to trade deficit, which shows lack of policies supporting to increase export of Pakistan.

In year 2014 the scenario represents by product mapping shows that number of commodities in group A has not increased enough to represent stronger global competitiveness and successfully decreasing or maintaining trade deficit. The number of commodities slightly increased to 23 in the group A. The results of the study also uncovered that the commodities are in group D increase to 140 as compared with 136 in year 2000. This shows an increased trade deficit in balance of payment of Pakistan. In 2014 Pakistan became the more net importer of commodities which shows that policy failure of narrowing the gap between commodities having NRCE > 0, TBI > 0 and NRCA < 0, TBI < 0 (group A and group D commodities).

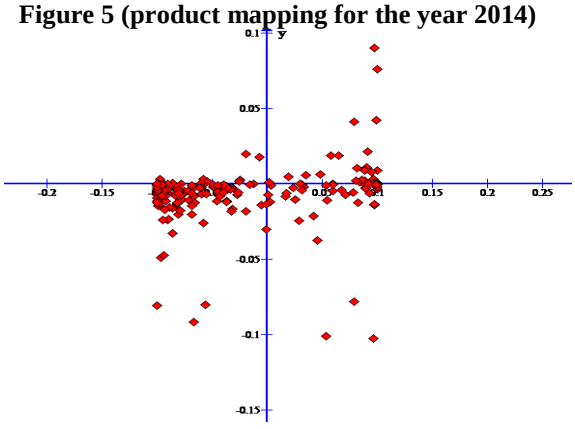
Similarly, this technique also give the picture of current scenario of Pakistan's trade. By using product mapping the study identify that the increases in number of commodities in group A is less than the number of commodities in group D in year 2015. In year 2015 there are 26 commodities in group A and 150 commodities in group D. Which confirms that the trade deficit increases every year because more and more commodities are added to group D (net importer of commodities).

Figure 4 (product mapping for the year 2000)



Source: authors' calculation

Figure 5 (product mapping for the year 2014)



Source: authors' calculation

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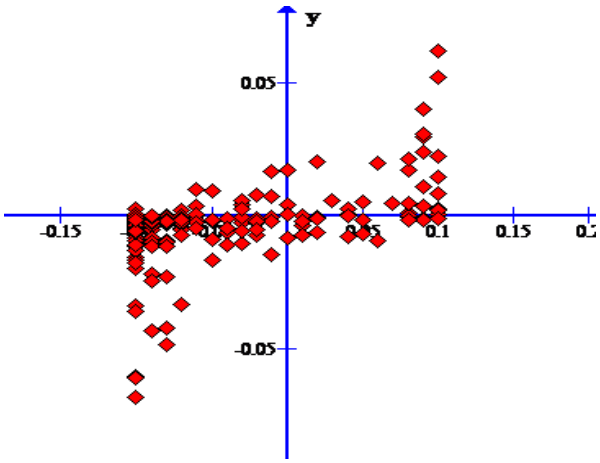
Product mapping for the year 2015 (figure 6)



Source: authors' calculation

4.3 Potential products for exports

This section will search for commodities that have the potential to substantially raise exports of Pakistan. Table 3 mentions commodities which are found through the above methodology. Following list is constructed by considering the commodities that appear in the group B and C in the product mapping. Group B involves the commodities taking values of NRCA > 0 and TBI＜0, whereas group C comprises values of NRCA < 0 but TBI > 0. These commodities are characterized as 'potential' for the reason that commodities of group B have the power to compete in the global market (showing by positive NRCA) on the other hand, these products entail a strong demand in the domestic market (indicated by negative TBI). This may be one of the elements of profitability mentioned by Porter (1990). Two advantages are achieved if these commodities are fostered to gain specialization in export. First, exports of Pakistan will increase and second, it will decrease import demand. Additionally, domestic demand condition will enable these commodities to get benefit from scale effects that will also help to participate and progress in international markets.

As Table 3 shows the products having export potential. Commodities 659, 562, 431, 075 exhibited NRCA > 0 and TBI < 0 throughout the whole period of examination representing their substantial import demand and also capable to compete in international market. Therefore, if these commodities are focused and proper incentives are provided that help in capacity expansion might play a substantial role to increase power of competitiveness due to existing of scale efficiency and also decrease pressure on the trade deficit by reducing import demand by domestic residents. On the other hand, commodities of group C exhibited positive TBI, which shows that these commodities have gain access to international markets but have the low competitiveness power to compete. Commodities in this group may play substantial role in the long run if they gain competitiveness power in future.

Table 3: list of export potential commodities

SITC CODE	PRODUCT DEFINITION	PRODUCT GROUP*	NRCA	TBI
659	FLOOR COVERINGS, ETC.	B	+	-
562	FERTILIZER,EXCEPT GRP272	B	+	-
431	ANIMAL,VEG.FATS,OILS,NES	B	+	-
075	SPICES	B	+	-
287	ORE,CONCENTR.BASE METALS	C	-	+
048	CEREAL PREPARATIONS	C	-	+
059	FRUIT, VEGETABLE JUICES	C	-	+
056	VEGTABLES,PRPD,PRSVD,NES	C	-	+
121	TOBACCO, UNMANUFACTURED	C	-	+
898	MUSICAL INSTRUMENTS,ETC.	C	-	+

Source: authors' calculation, *based on product mapping

V. CONCLUSION AND POLICY RECOMMENDATIONS

The process of globalization is going to expand with the passage of time creating different kinds of opportunities as well as challenges. In the said study, we are witnessing those countries which are not eager in innovation and not taking initiatives, are lack of global competition. Pakistan is a country that is not pursuing innovation and bold initiatives which is a matter of deep concern for the economic managers and policy-makers. Further, as the study showed that record trend of our foreign trade shows a real threat to our economy.

This study utilizes normalized revealed comparative advantage and product mapping techniques to find and explore the results. Estimation based on these techniques, identifies that Pakistan's revealed comparative advantage consists of 34 commodities in 2014-15 as compared with 37 commodities in 2000-01, concentrated in some agricultural and low value-added manufacturing industries. This study also explores the situation by considering industry-wise decomposition. It is further noted that Pakistan's revealed comparative advantage lies in primary products and unskilled labor intensive products. In case of primary products, Pakistan, shows an increasing trend in a number of comparative advantage commodities followed by unskilled labor intensive products which shows decreasing trend. At the end, this study identifies commodities of export potential. These commodities include SITC 659, SITC 562, SITC 431, and SITC 075 which shows the competitiveness power in the global market. Ongoing challenges relating to our foreign trade are formidable. It is therefore recommended to take the following steps and initiatives to correct them.

- Remedial measures should be taken for encouraging production related factors. Among those factors, underutilization of resources is quite a serious issue. So, methods should be identified that lead to resource optimization in industries.
- Shortages of electricity and gas have been the major impediments to the growth of competitive exports. These constraints create serious problems related to timely deliveries and becoming uncompetitive due to the high cost of production. So, there is an urgent need to ensure uninterrupted supply of energy at a competitive cost.
- In Pakistan, negligence to human resource development has become a major hindrance to the growth of our economy on sustainable basis. It is imperative for growth and development of the nation that planned policies should be carried out in order to boost human capital through high quality education and training.
- Deteriorating law and order situation has badly affected the economy in two ways. Firstly, this decreases investment and secondly it increases insecurity for an existing business sector of the economy. Government should take effective steps to improve law and order condition.
- Physical infrastructure is the basis of development for industry and provide the basis for investment. By employing policies concerning the provision of physical infrastructure, we will provide conducive environment for business and investment.
- Government should continuously keep an eye to changing environment and global market conditions which is useful to make export friendly policies.
- Pakistan major export comprises of primary products and unskilled labor intensive products. There is a need to promote value added export to increase export growth.

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APPENDIX

CLASSIFICATIONS OF PRODUCTS

Natural resource intensive products	611, 612, 634,635, 661,662,663, 667,682, 684,686
Primary products	1,12,22,25,34,41,43,44,45,48,54,56,57,223,232,247,251,261,263,264,265,266,267,268,269,273,58,61,62,73,74,75,81,98,111,121,122,211,222,277,278,282,287,288,291,292,333, 334,335,421,422,431
Technology intensive products	511,512,513,514,516,522,523,541,562,572,582,591,592,598,711,712,713,714,516,522,523,541,562,572,582,591,592,598,711,712,713,714,716,718,721,722,723,724,725,726,727,728,737,741,742,743,744,745,749,751,752,759,764,771,772,773,774,775,776,778,792, 871,872,873,874, 882,883,884,895
Unskilled labor intensive products	651,652,653,654,655,656,657,658,659,664,665,666,793,812,821,831,842,843,844,845,846,848,851, 894,895
Human capital intensive products	531,532,533,551,552,553,554,621,625,641,642,672,675.676,679,691,692,693,694,695,696,697,699,761,763,781,782,783,784,785,786,791,885,892,896,897, 898,899

Source: Empirical Trade Analysis

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COMMODITIES CODE AND THEIR DEFINITIONS

SITC CODE	PRODUCT DEFINITION	SITC CODE	PRODUCT DEFINITION	SITC CODE	PRODUCT DEFINITION	SITC CODE	PRODUCT DEFINITION
422	FIXED VEG.FAT,OILS,OTHER	59	FRUIT, VEGETABLE JUICES	522	INORGANIC CHEM.ELEMENTS	658	TEXTILE ARTICLES NES
515	ORGANO-INORGANIC COMPNDS	764	TELECOMM.EQUIP.PARTS NES	531	SYNTH.COLOURS,LAKES,ETC.	652	COTTON FABRICS, WOVEN
289	PREC.METAL ORES,CONCTRTS	775	DOM.ELEC,NON-ELEC.EQUIPT	771	ELECT POWER MACHNY.PARTS	42	RICE
629	ARTICLES OF RUBBER, NES	582	PLASTIC PLATE,SHEETS,ETC	721	AGRIC.MACHINES,EX.TRACTR	651	TEXTILE YARN
211	HIDES,SKINS(EX.FURS),RAW	533	PIGMENTS, PAINTS, ETC.	895	OFFICE,STATIONERY SUPPLS	841	MENS,BOYS CLOTHNG,X-KNIT
782	GOODS,SPCL TRANSPORT VEH	655	KNIT.CROCHET.FABRIC NES	281	IRON ORE, CONCENTRATES	843	MENS,BOYS CLOTHING,KNIT
786	TRAILERS,SEMI-TRAILR,ETC	56	VEGTABLES,PRPD,PRSVD,NES	47	OTHER CEREAL MEAL,FLOURS	842	WOMEN,GIRL CLOTHNG,XKNIT
267	OTHER MAN-MADE FIBRES	98	EDIBLE PROD.PREPRTNS,NES	727	FOOD-PROCESS.MCH.NON DOM	848	CLOTHNG,NONTXTL;HEADGEAR
749	NON-ELECT MACH.PARTS,ETC	554	SOAP,CLEANERS,POLISH,ETC	591	INSECTICIDES, ETC.	845	OTHR.TEXTILE APPAREL,NES
684	ALUMINIUM	682	COPPER	685	LEAD	611	LEATHER
746	BALL OR ROLLER BEARINGS	579	PLASTIC WASTE, SCRAP ETC	58	FRUIT,PRESERVED,PREPARED	661	LIME,CEMENT,CONSTR.MATRL
421	FIXED VEG.FAT,OILS, SOFT	642	PAPER,PAPERBOARD,CUT ETC	812	PLUMBNG,SANITRY,EQPT.ETC	846	CLOTHING ACCESSRS,FABRIC
735	PARTS,NES,FOR MACH-TOOLS	722	TRACTORS	742	PUMPS FOR LIQUIDS,PARTS	57	FRUIT,NUTS EXCL.OIL NUTS
871	OPTICAL INSTRUMENTS,NES	673	FLAT-ROLLED IRON ETC.	232	SYNTHETIC RUBBER, ETC.	334	PETROLEUM PRODUCTS
43	BARLEY, UNMILLED	831	TRUNK,SUIT-CASES,BAG,ETC	885	WATCHES AND CLOCKS	653	FABRICS,MAN-MADE FIBRES
261	SILK	778	ELECTRIC.MACH.APPART.NES	898	MUSICAL INSTRUMENTS,ETC.	894	BABY CARRIAGE,TOYS,GAMES
711	STEAM GENER.BOILERS,ETC.	874	MEASURE,CONTROL INSTRMNT	1	LIVE ANIMALS	512	ALCOHOL,PHENOL,ETC.DERIV
873	METERS,COUNTERS,NES	784	PARTS,TRACTORS,MOTOR VEH	654	OTH.TEXTILE FABRIC,WOVEN	61	SUGARS,MOLASSES,HONEY
763	SOUND RECORDER,PHONOGRPH	121	TOBACCO, UNMANUFACTURED	745	OTH.NONELEC MCH,TOOL,NES	872	MEDICAL INSTRUMENTS NES
896	WORKS OF ART,ANTIQUE ETC	664	GLASS	44	MAIZE UNMILLED	844	WOMEN,GIRLS CLOTHNG.KNIT
678	WIRE OF IRON OR STEEL	741	HEATNG,COOLNG EQUIP,PART	662	CLAY,REFRCT.CONSTR.MATRL	263	COTTON
811	PREFABRICATED BUILDINGS	713	INTRNL COMBUS PSTN ENGIN	524	OTHER CHEMICAL COMPOUNDS	34	FISH,FRESH,CHILLED,FROZN
73	CHOCOLATE,OTH.COCOA PREP	792	AIRCRAFT,ASSOCTD.EQUIPNT	111	NON-ALCOHOL.BEVERAGE,NES	333	PETROLEUM OILS, CRUDE
335	RESIDUAL PETROL.PRODUCTS	523	METAL.SALTS,INORGAN.ACID	621	MATERIALS OF RUBBER	46	MEAL,FLOUR OF WHEAT,MSLN
71	COFFEE,COFFEE SUBSTITUTE	573	POLYMERS,VINYL CHLORIDE	731	METAL REMOVAL WORK TOOLS	542	MEDICAMENTS
675	FLAT-ROLLED, ALLOY STEEL	592	STARCHES,INULIN,ETC.	671	PIG IRON,SPIEGELEISN,ETC	54	VEGETABLES
776	TRANSISTORS,VALVES,ETC.	723	CIVIL ENGINEERING EQUIPT	223	OILSEED(OTH.FIX.VEG.OIL)	574	POLYACETAL,POLYCARBONATE
516	OTHER ORGANIC CHEMICALS	553	PERFUMERY,COSMETICS,ETC.	781	PASS.MOTOR VEHCLS.EX.BUS	851	FOOTWEAR
583	MONOFILAMENT OF PLASTICS	282	FERROUS WASTE AND SCRAP	793	SHIP,BOAT,FLOAT.STRUCTRS	292	CRUDE VEG.MATERIALS, NES
689	MISC.NON-FERR.BASE METAL	541	MEDICINES,ETC.EXC.GRP542	712	STEAM TURBINES	11	BOVINE MEAT
791	RAILWAY VEHICLES.EQUIPNT	612	MANUFACT.LEATHER ETC.NES	666	POTTERY	659	FLOOR COVERINGS, ETC.
751	OFFICE MACHINES	656	TULLE,LACE,EMBROIDRY.ETC	747	TAPS,COCKS,VALVES,ETC.	897	GOLD,SILVERWARE,JEWL NES
251	PULP AND WASTE PAPER	663	MINERAL MANUFACTURES,NES	672	INGOTS ETC.IRON OR STEEL	431	ANIMAL,VEG.FATS,OILS,NES
274	SULPHUR,UNRSTD.IRON PYRS	268	WOOL, OTHER ANIMAL HAIR	676	IRON,STL.BAR,SHAPES ETC.	278	OTHER CRUDE MINERALS
687	TIN	598	MISC.CHEMICAL PRODTS.NES	694	NAILS,SCREWS,NUTS,ETC.	288	NON-FERROUS WASTE,SCRAP
231	NATURAL RUBBER, ETC.	695	TOOLS	891	ARMS AND AMMUNITION	679	TUBES,PIPES,ETC.IRON,STL
881	PHOTOGRAPH APPAR.ETC.NES	677	RAILWAY TRACK IRON,STEEL	122	TOBACCO, MANUFACTURED	81	ANIMAL FEED STUFF
532	DYEING,TANNING MATERIALS	74	TEA AND MATE	783	ROAD MOTOR VEHICLES NES	36	CRUSTACEANS,MOLLUSCS ETC
248	WOOD, SIMPLY WORKED	511	HYDROCARBONS,NES,DERIVTS	931	SPEC.TRANSACT.NOT CLASSD	62	SUGAR CONFECTIONERY
325	COKE,SEMI-COKE,RET.CARBN	699	MANUFACTS.BASE METAL,NES	285	ALUMINIUM ORE,CONCTR.ETC	657	SPECIAL YARN,TXTL.FABRIC
322	BRIQUETTES,LIGNITE,PEAT	35	FISH,DRIED,SALTED,SMOKED	23	BUTTER,OTHER FAT OF MILK	821	FURNITURE,CUSHIONS,ETC.
525	RADIO-ACTIVE MATERIALS	772	ELEC.SWITCH.RELAY.CIRCUT	272	FERTILIZERS, CRUDE	696	CUTLERY
762	RADIO-BROADCAST RECEIVER	728	OTH.MACH,PTS,SPCL INDUST	718	OTH.POWR.GENRTNG.MACHNRY	287	ORE,CONCENTR.BASE METALS
593	EXPLOSIVES,PYROTECHNICS	759	PARTS,FOR OFFICE MACHINS	725	PAPER,PULP MILL MACHINES	12	OTHER MEAT, MEAT OFFAL
683	NICKEL	25	EGGS,BIRDS,YOLKS,ALBUMIN	686	ZINC	22	MILK AND CREAM
884	OPTICAL GOODS NES	37	FISH ETC.PREPD,PRSVD.NES	17	MEAT,OFFL.PRPD,PRSVD,NES	273	STONE, SAND AND GRAVEL
91	MARGARINE AND SHORTENING	724	TEXTILE,LEATHER MACHINES	693	WIRE PRODUCTS EXCL.ELECT	222	OILSEED(SFT.FIX VEG.OIL)
246	WOOD IN CHIPS, PARTICLES	716	ROTATING ELECTRIC PLANT	597	PREPRD ADDITIVES,LIQUIDS	75	SPICES
277	NATURAL ABRASIVES, NES	667	PEARLS,PRECIOUS STONES	774	ELECTRO-MEDCL,XRAY EQUIP	572	POLYMERS OF STYRENE
16	MEAT,ED.OFFL,DRY,SLT,SMK	692	CONTAINERS,STORAGE,TRNSP	733	MACH-TOOLS,METAL-WORKING	893	ARTICLES,NES,OF PLASTICS
284	NICKEL ORES,CONCTR,MATTE	674	FLAT-ROLLED PLATED IRON	266	SYNTHETIC FIBRES	743	PUMPS NES,CENTRIFUGS ETC
24	CHEESE AND CURD	41	WHEAT, MESLIN, UNMILLED	752	AUTOMATC.DATA PROC.EQUIP	48	CEREAL PREPARATIONS
45	OTHER CEREALS, UNMILLED	575	OTH.PLASTIC,PRIMARY FORM	737	METALWORKING MACHNRY NES	691	METALLIC STRUCTURES NES
761	TELEVISION RECEIVERS ETC	744	MECHANICAL HANDLNG EQUIP	283	COPPER ORES,CONCENTRATES	697	HOUSEHOLD EQUIPMENT,NES
72	COCOA	892	PRINTED MATTER	551	ESSNTL.OIL,PERFUME,FLAVR	634	VENEERS, PLYWOOD, ETC.
264	JUTE,OTH.TEXTL.BAST FIBR	785	CYCLES,MOTORCYCLES ETC.	748	TRANSMISSIONS SHAFTS ETC	899	MISC MANUFCTRD GOODS NES
882	PHOTO.CINEMATOGRPH.SUPPL	625	RUBBER TYRES,TUBES,ETC.	726	PRINTNG,BOOKBINDNG MACHS	641	PAPER AND PAPERBOARD
411	ANIMAL OILS AND FATS	581	PLASTIC TUBE,PIPE,HOSE	613	FURSKINS,TANNED,DRESSED	291	CRUDE ANIMAL MATERLS.NES
245	FUEL WOOD, WOOD CHARCOAL	773	ELECTR DISTRIBT.EQPT NES	514	NITROGEN-FUNCT.COMPOUNDS	513	CARBOXYLIC ACIDS,DERIVTS
321	COAL,NOT AGGLOMERATED	665	GLASSWARE	571	POLYMERS OF ETHYLENE	269	WORN CLOTHING,TEXTL.ARTL
633	CORK MANUFACTURES	635	WOOD MANUFACTURES, NES	813	LIGHTNG FIXTURES ETC.NES	714	ENGINES,MOTORS NON-ELECT

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