Competitiveness and Export Performance of Pakistan’s Mineral Sector in Global Market: A Constant Market Share Analysis

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The aim of current research is to measure the export competitiveness in the mineral sector of Pakistan in the world market. This study collected the data from International Trade Center (ITC) and employed Constant Market Share Analysis (CMSA) to quantify the competitiveness in the mineral exports during 2011-2021. The CMSA depicts the growth of any country’s exports in terms of their competitiveness, market and product structure. In addition, the change in total exports decomposes at both first and second level decomposition. This study finds out that average structural effect (SE), total effect (TE), competitive effect (CE), commodity effect (COME) and specific competitive effect (SCE) are positive from 2011-2021, while average residual effect (RE), market effect (ME), interaction effect (IE), general competitive effect (GCE) are negative. The current imperative is to explore and harvest natural assets utilizing cutting-edge technology and skill. Pakistan should concentrate on diversifying its mineral resources, both in terms of the nature of the products and the markets they serve. For increased profits, the nation should target those markets with relatively larger profit margins and advantageous terms of trade.

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1. Introduction

Export competitiveness, while ostensibly intuitive, remains conceptually and empirically intangible. The export performance of an economy is depending on two factors: the demand of its products in various markets and its capacity to supply them at competitive price levels. In turn, there are a large number of factors of demand for and supply of the commodity. Thus, the demand of an economy’s exportable would be depend on per capita income of the imported country, domestic
availability, pattern of consumption, alternative sources of supply, relative competitiveness, policy of trade of importing economy, transport cost and nature of the political relationship between the two economies (Sharma, 1992). Similarly, the determinants of a supplier country include exportable surplus, cost of production, prices of domestic and foreign market, relative prices of the competitors economies, quality and design of the product, standards of packing, in time delivery, exchange rate and trade policy of the supplier economy (Sharma, 1992).

There are enormous mineral reserves in Pakistan, which are spread out over an outcrop area of 60 million square kilometers. There are ninetytwo known minerals, however only 52 are currently being mined for commercial purposes, resulting in an annual output of 68.56 million metric tons. The industry is a promising one with an average rate of growth of 2% to 3% per year, the presence of more than 5,000 mines that are currently active, 50,000 medium and small-sized businesses, and the direct employment of 300,000 individuals. In addition to an estimated number of billions of barrels of crude oil, Pakistan is the second largest salt mines, the fifth largest copper and gold reserves, and the second greatest coal deposits in the world. Despite having a massive untapped potential, Pakistan's mining industry only contributes around 3% to the country's GDP, whereas the country's exports only account for roughly 0.1% of the global total. In the year 2017, the entire value of mineral exports of Pakistan was 0.5 billion US dollars, whereas the value of the world's mineral exports was 401 billion US dollars.

The CMSA is a method that used to quantify the performance of exports of an economy compared to the rest of the world or a single market. It is similar to the structural analyses that are done on national macroeconomic accounts or input-output tables. This method is an accounting method for decomposing an economy’s growth of aggregated export shares into a structural effect and competitiveness effect. The technique shows that even if a country keeps the same share of every product in every market, its overall market share can still go down if it exports to markets that grow slower than the world average and/or if it exports products whose demand grows slower than the average. The competitiveness effect is the ability of an economy to enhance its market share due to only the determinants of competitiveness, independently of the structural developments in the economy or trade patterns of the commodities. If an economy only exports traditional goods for which international demand is growing slowly compared to other goods, its total export market share in world trade will go down even if it manages to keep its market share in these traditional goods. The regional distribution of export markets follows a similar logic. Therefore, a pattern of exports focused on the most active markets and commodities in global trade leads to improved export performance (Skriner, 2009).

Pakistan’s mineral exports to the global market were valued at 514.407 million US dollars in 2010 and climbed by 9.85% in 2011. A significant amount of mineral exports to the rest of the globe were noted in 2012 and 2013. In the global market, Pakistan’s mineral exports declined on average by 8.90% from 2014 to 2020. Exports in this industry climbed by 12.69% in 2021 to 484.722 million US dollars. The purpose of proposed research is to examine the export competitiveness in the mineral sector of Pakistan by applying CMSA from 2010-2021. This study will be helpful for policy makers to enhance the export share of Pakistan’s economy in global market and also increased the foreign trade earnings.

2. Literature Review

Richardson (1971) employed some sensitivity test for CMSA of export growth. Milana (1988) explained the method of CMSA and index number theory. The competitiveness of Canadian agri-food exports against competitors in Asia was examined by Chen and Duan (2001) by utilizing CMSA from
1980-1997. The specialization and competitiveness of Austrian economy was analyzed by Skriner (2009) by utilizing CMSA. The Austrian export sector is vulnerable because the disadvantages in competitiveness have disappeared, but the market and product structure effects show unfavorable tendencies after 2000. The export performance of Euro area has been examined by Cafisoγ, (2009) during 1996-2007 by employing CMSA. Nee and Jerbi (2009) worked on the market shares in the post Uruguay era by employing a shift share analysis. The purpose of this study is examined the market shares by assuming constant market share assumption and it divided the growth of exports into four major components. Marini, G. (2010) applied CMSA to investigate the comparisons of firms average profitability between economies. Export competitiveness of furniture of Malaysia was examined by Haque et al., (2013) by employing RCA, CMSA and Shift share analysis from 2000-2011. The results of current analysis illustrate that Malaysia had improved its market share and competitive advantage throughout the selected time period. A note was written by Bonanno,(2014) on the measurement of CMSA. This study purposed a complete framework for CMSA and also provide formal derivation of market share variation. The export performance of Pakistan and Bangladesh was examined by Mehmood (2015) by utilizing CMSA during 2004-2013. The conclusion of this study shows that the world trade effect had a big positive effect on Pakistan and Bangladesh’s exports. Wizarat and Ahmad (2015) conducted a study to examine the export performance of Pakistan in APEC markets by employing CMSA from 2003-2012. CMSA findings indicated that the effect of World Trade on Pakistan’s export growth was positive, while the CCE, MDE and the CME were causing problems for exports growth throughout the selected time span except for few years. Ahmad and Wizarat (2015) used CMSA to look at how well Pakistan's exports did in the developed market economies from 2003 to 2012. This study concluded that Pakistan had a potential to increase its exports to developed market economies in the concerned time period. The CMSA was employed by Gilbert and Muchova (2018) to examine the export competitiveness of eastern and central Europe and concluded that CEE economies faced an export competitiveness in selected time period. The determinants of China’s export performance were investigated by Bagaria and Ismail (2019) by utilizing CMSA from 2002-2014. Kamal et al., (2021) conducted a study to examine the export performance of Pakistan in central Asia by applying CMSA and stochastic frontier gravity model from 2003-2017. The analysis shows that export performance is mostly due to its competitiveness on the world market, even though the competitiveness of all three selected categories had been going down. Indian merchandise exports to Asia is analyzed by Fayaz and Kaur (2022) by utilizing CMSA during time period from1980-2016. The index of CMSA illustrated that India had strengthened and maintained its exports market share primarily in low technology/labor-intensive and resource-based products. Jamilah, (2022) employed CMSA to measure the Indonesian palm oil in EU markets. The findings of this research indicated that the average growth of Indonesian economy in Europe is 0.1526, showing this country was able to take advantage of CPO export opportunities. Similarly, Kumar (2022) applied CMSA to measure the competitiveness of Indian agricultural exports to world market during 1991-2020. Many studies are applied CMSA to measure the competitiveness in the different sectors of Pakistan economy but no valuable study has been utilized this method to examine the competitiveness in the exports of mineral sector of Pakistan. The study's goal is to help stakeholders involved in Pakistan's mineral sector develop better policies to create a favorable environment for mineral product exports. It will also benefit as a locating factor for public and government investment-friendly business transactions.

3. Methods and materials

The key objective of current research is to examine the competitiveness in the mineral sector of Pakistan (PRODUCT GROUP 25) by employing CMSA (Chen and Duan,2001). In this study, the competitiveness was measured by using the first and second level decompositions of CMSA. There are three main effects on the change in exports: the competitive effect, the structural effect, and the second
order effect. On the second level, these three effects are further divided into eight effects. Data were collected from International Trade Center (ITC, 2021) on the mineral sector exports of Pakistan and world during 2011-2021.

On the first level, the total effect is broken down into the structural effect, the competitive effect, and the second-order effect. On the second level, the structural effect is further broken down into the market effect, the growth effect, the commodity effect, and the interaction effect. There are two types of competitive effects: the specific competitive effect and the general competitive effect. The second order effect is also split into two parts: the pure second order effect and the dynamic structural residual.

The equation of first level decomposition is written as:

\[ \Delta E = \sum_i \sum_j S_{ij}^0 \Delta Z_{ij} + \sum_i \sum_j Z_{ij} \Delta s_{ij} + \sum_i \sum_j \Delta S_{ij} \Delta Z_{ij} \]

(Source: Maqbool et al., 2018)

The equation of second level decomposition is explained as:

\[ \Delta E = s^0 \Delta Y + \left( \sum_i \sum_j S_{ij}^0 \Delta Z_{ij} - \sum_i S_i^0 \Delta Z_i \right) + \left( \sum_i \sum_j S_{ij}^0 \Delta Z_{ij} - \sum_j S_j^0 \Delta sZ_j \right) \]
\[ + \left[ \left( \sum_i S_i^0 \Delta Z_i - S^0 \Delta Z \right) - \left( \sum_i \sum_j S_{ij}^0 \Delta Z_{ij} - \sum_j S_j^0 \Delta Z_j \right) \right] + \Delta sZ^0 \]
\[ + \left( \sum_i \sum_j \Delta S_{ij} Z_{ij}^0 - \Delta sZ^0 \right) \]
\[ + \left( Z^1 / Z^0 - 1 \right) \sum_i \sum_j \Delta S_{ij} Z_{ij}^0 \]
\[ + \left[ \sum_i \sum_j \Delta S_{ij} \Delta Z_{ij} - \left( Z^1 / Z^0 - 1 \right) \sum_i \sum_j \Delta S_{ij} Z_{ij}^0 \right] \]

(Source: Maqbool et al., 2018)

In the above equations, E represents the total minerals exports of Pakistan to global market, s denotes market share of Pakistan’s minerals exports in global market, sj is Pakistan’s market share of minerals exports in destination j, si is Pakistan’s market share of minerals exports i in global market, sij is Pakistan’s market share of minerals i in destination j, Z is total global imports of minerals products, Zj is total minerals imports in destination j, Zi is total world imports of commodity i, Zij is total imports of commodity i in destination j, \( \Delta \) portrays the change in the two time periods, superscript o is the initial year, i is the terminal year and subscript i denotes export products.
4. Results and discussions

Table 1: CMSA of Pakistan Mineral exports in global market (product group 25) from 2011-2021 (US 000$)

| Years | TE    | SE    | CE     | SOE    | GE     | ME     | COME   | IE     | GCE    | SCE    | PSOE   | DSR    |
|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 2011  | 110772| 100683| 10400  | -310.646| 4326237| -4225554| 36134.3 | -36134.3| -329084| 339484 | 2101.19| -2411.84|
| 2012  | 152773| 470422| -46957 | -270691| 356449 | 113972 | 470915 | -470915| -1071472| 1024515| -660.43| -270031|
| 2013  | 13833 | -213700| 1034077| -806543| 613661 | -827361| -199070| 199070 | -103864| 1137941| 25781.3| -832325|
| 2014  | -30562| 1284709| -238488| -1076783| 989.75 | 1283719| 1260095| -1260095| -399675| 1137941| 25781.3| -832325|
| 2015  | -170627| -28941| -151076| 9390.21 | -3206200| 3177259| -763.28| 763.28 | 658427 | -809503| 19592.9| -10202.7|
| 2016  | -81366| 197835| -144052| -135149| -654231| 852065 | 237859 | -237859| -928494| 784443 | 4266.51| -139416|
| 2017  | -32002| 159369| -94854 | -96517.3| -2115917| 102116 | -102116| -669158| 574304 | -9774.3| -86743|
| 2018  | -1599 | 1538.34| 3603.98| -6741.32| 2200335| -2198797| -39359| 39359.4| -302896| 306500 | 361.907| -7103.22|
| 2019  | 37222 | 7477.84| 31143.8| -1399.64| -700153| 707631 | 6587.96| -6587.96| 762810 | -731666| -917.02| -482.619|
| 2020  | -11422| -36536| 41558.1| -16444.6| -1604729| 1568194| -134.93| 134.93 | 33883.1| 7675.02| -2799.9| -13644.7|
| 2021  | 65125 | 58310.8| 32040  | -25225.8| 5102943| -5044632| -15564| 15563.8| 1245638| -1213598| 7349.65| -32575.4|

(Source: Authors own calculations)
In table 1, the results of the research exemplify that the TE is observed positive in the years from 2011-13, 2019 & 2021. The positive TE highlights the expansion of the mineral exports, while the negative TE portrays the exports are not expended in the remaining years. The exports of Pakistan are mainly change by the SE. In addition, the second level decomposition shows that world growth had the biggest effect on Pakistan's positive SE. This high SE shows that the demand for mineral products from Pakistan is rising quickly on the world market because Pakistan is becoming an expert at making these products.

The positive CE shows an increase in the share of these products in the other markets of the world, while the negative CE highlights the high decline in the market share in world. One of the main reasons why Pakistani exports can't compete on international markets is that they cost too much to make. The cost of doing business in Pakistan is very high because the country's economy is inefficient and hostile. High company costs are mostly caused by the cost of utilities and financing, the cost of raw materials, the cost of human resources (mostly unskilled labour), infrastructure, technology, and institutions that help the business. During the chosen time frame, the effect of the leftovers is negative, except in 2015. This bad result shows that exports have gone down because of law situation, politics, crimes in the economy, energy problems, and other things. The ME illustrates the effects of Pakistan's distribution of market on its export's performance. The ME was seen negative in the years 2011,2013, 2017, 2018 & 2021, whereas it was seen positive in other years. The unfavorable influence on the market indicates that Pakistan did not place sufficient emphasis on the rapidly expanding markets; nevertheless, Pakistan did place significant emphasis on rapidly expanding markets in the remaining years.

The positive commodity effect (COME) shows that Pakistan put a lot of focus on exporting minerals to the world market of fast-growing commodities, while the negative COME highlights that Pakistan did not lay emphases on these products. Specific competitive effect indicate that Pakistan was competitive in terms of SCE in the years 2011-2014, 2016-2018 and in 2020, whereas Pakistan was not competitive in the remaining years. The GCE was seen positive in 2015, and 2019-2021. This positive GCE shows that Pakistan was competitive in these years. The negative GCE shows that Pakistan wasn't able to make its exports of certain goods to certain places more competitive. The decline in the market shares of mineral products on the global market was the main reason why the general competitive effect went down.

5. Conclusions
The key purpose of this study is to examine the export competitiveness in the mineral sector of Pakistan by employing CMSA during 2011-2021 in the global market. The data have been taken from International Trade Center. The results of this research demonstrate that average SE, TE, CE, GCE, COME and SCE are positive from 2011-2021, whereas average RE, ME, interaction effect (IR), GCE are negative. The advancement of Pakistan's mineral industry will be beneficial to the country's economy in a variety of ways, including the enhancement of trade and exports, the rise of employment and income levels, the attraction of both domestic and international investment, and the acceleration of economic growth.

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