Comparative Advantage in International Trade: A Study Based on Meat Exports in Pakistan

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1. Introduction

Competitiveness has assumed much significance in the ever-changing competitive world, and hence a number of results-oriented researches have been conducted to better its understanding in the global economies. The method of revealed comparative advantage index supported by Balassa’s...
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(Balassa, 1965) is one of the renowned strands of literature that combines the theories of international trade with competitiveness. Since this influential work, a vast amount of literature has been dedicated to the analyses of revealed comparative advantage of international trade (Costinot et al., 2012, Schneider and Paunescu, 2012 and Koopman et al., 2014). The sectors of agri-food are usually neglected in the empirical literature despite the significance of the topic. The purpose of this study is to assess Pakistan’s competitiveness in the global meat trade.

The agricultural sector is a key to the economic growth of the economy, employment generation, food security and poverty alleviation particularly at the rural level of the economy. This sector contributes 19.2% to the GDP and provides employment level to approximate 38.5% of the labour force. The growth rate of agricultural sector has been shrinking due to arable land, water shortage, climate change, large-scale population and labour force shift from rural areas to urban areas. The enhancement in agricultural productivity needs for adoption of new approaches. This sector plays a vital role to increase the economic growth with the help of industrial and services sectors. Further, the agrarian sector has four sub-sectors including: fisheries, livestock, crops and forestry (GOP, 2021).

The livestock sector has emerged as the biggest subsector in the agricultural over the last few decades. Livestock sector consists of buffalos, cattle, sheep, camel, goat, horses, mules, asses and poultry and poultry commodities. This sector contributes 60.1% to the agricultural value addition and 11.55% to the GDP in the year 2021. The gross value addition in the livestock sector increased to 1505 billion in the year 2021 from 1461 billion in 2020, an increase of 3%. The government of Pakistan has renewed its concentration on the growth of livestock sector, food security and poverty alleviation in the economy. The overall livestock development strategy resolves to foster "private sector-led development with the public sector providing a suitable environment through policy interventions". To enhance the per unit animal productivity, certain regulatory measures including health coverage, animal breeding practices, artificial insemination services, controlling livestock diseases, management practices and balanced ration for animal feeding have been adopted (GOP, 2021).

In Pakistan, meat, poultry and dairy are considerable economic activities in the sub-sector of livestock. The demand of meat and its products has drastically increased during the last decade due to economic growth, rapid urbanization, industrialization, knowledge about diet and changing lifestyle; this trend is likely to continue in the upcoming years (OECD-FAO, 2017). The taste of Pakistani meat has a unique due to its organic nature and it has been exported to Gulf economies in huge quantity. Meat and meat preparation exports of Pakistan are expanding to different economies of the world. Export values and volume of meat have recorded 100% increase over a decade as exports have doubled from USD 152.4 million in FY11 to USD 304.2 million in FY20 (GOP, 2021).

The objective of this is to examine and measure export performance and competitiveness in the meat export sector of Pakistan from 2004-2020. This study utilized several indices of revealed comparative advantage such as RCA, RSCA, LnRCA, RCA#, RTA, RMA, RC and TBI to examine the competitiveness and comparative advantage. This will support the other researchers and academicians of Pakistan to scrutinize the comparative advantage and competitiveness of different sectors by utilizing these indices.

2. Review of literature

A relatively limited and small number of studies are dedicated to the analysis of comparative advantage and competitiveness of food and agricultural products. Most of the studies were written on the developed economies, especially Europe, and their positions, whereas the numbers of studies on
developing economies are highly limited. The RCA index was employed by Balassa and Marcus (1989) to measure competitiveness in USA and Japan during 1967-1983. McEachern and Seaman (2005) found the perceptions of consumers regarding meat production that, how the competitiveness of British agriculture could be enhanced through understanding communication with the consumers. Results indicated that consumer perceptions on meat production diverge widely it was due to some differences between urban and rural consumers. Wu et al., (2012) analyzed the competitiveness of Chinese rabbit export in the world market by employing RCA index. The results revealed that China had a higher comparative advantage in the production of rabbit meat every year since 2003. Stanciu et al., (2015) studied the competitiveness of the meat processing industry in Romania. This study analyzed the local meat processing industry in relation to production, consumption and trade transactions evaluated in the global context of the meat market. The analysis indicated that Romania had recorded significant development in the meat processing and production domain.

The RCA index was utilized by Rizwan-ul-Hassan (2013) to analyze the worldwide export competitiveness of Pakistan’s Agricultural Commodities. The RCA index for meat and meat preparation of Pakistan indicated weak position as RCA index was less than 1. The important factor was that the trend was increasing as RCA was 0.09 in the year 2002 but in 2010 it was 0.77. Horne and Bondt (2013) investigated the Competitiveness of the Europe Union poultry meat sector. The EU poultry meat producers have to face legislation including food safety, environmental protection and animal welfare. This study examined that how lowering import levies influences the competitiveness of the EU poultry meat industry. Erkan and Saricoban (2014) measured the export competitiveness of science-based commodities of Turkey and EU+13 economies. The export competitiveness of meat was studied by Bojnec and Ferto (2014) of EU countries using the revealed comparative advantage index in the global market. The study found that a large number of Europe union member states experienced comparative disadvantage in international meat markets. Smeets and García (2015) used value chain approach to assess the elements of competitiveness of the Europe Union (EU) beef sector. The results of the study showed that the supply chains could recover the disadvantaged condition of beef producers. Seleka and Kebakile (2017) investigated beef export competitiveness of Botswana for the period of 1961–2011 by using Normalized Revealed Comparative Advantage index. Results showed that Botswana had a comparative advantage throughout the study period. Further, it was observed that the comparative advantage of the country had weakened after 1975. Another study was conducted by Javed et al., (2018) to measure export competitiveness in the mutton sector by utilizing RCA, RSCA and nominal protection coefficient. The findings of the study observed three types of markets such as high potential markets, low potential markets and markets with no potential, and the study suggested exploring new markets to attract higher profit margins.

Fernandes et al., (2019) proposed certain insights that contribute in competitiveness and innovation in meat production chains. The results obtained through systematic review include three theoretical paradigms namely the institutional environment, consumer behavior and business capacity, under which the studies of innovation and competitiveness in meat production chains were based. Sardar et al., (2019) employed Nominal Protection Coefficient, Revealed Comparative Advantage and Revealed Symmetric Comparative Advantage indices to estimate the “possible” international markets for beef. The findings of the analysis categorized internal market into four categories such as markets with no potential, low potential markets, existing potential markets and future potential markets. Further, the study suggested to improve supply chain management, which could be possible through focusing on the international markets with high competitiveness and high price to earn more gross margins. Nabi et al., (2019) analysed the factors of Pakistan’s mutton exports in order to assess the country’s export performance in the worldwide market. The findings indicated that Pakistan’s mutton
exports were inversely correlated with the domestic meat price. On the other hand export price, the competitor's distance and Pakistani distance to export market was positively associated with the export of mutton.

Benalywa et al., (2019) measured competitive advantage and competitiveness broiler meat products from Malaysia, Netherlands, Indonesia, Philippines and Thailand by using different indices including RXA, RTA, InRXA, and RC. The results showed that, in Malaysia, only whole chickens and capons, frozen indicated an upsurge in competitiveness. Different indices of revealed comparative advantage were employed by Maqbool et al., (2020) to examine the competitiveness in the mineral sector of Pakistan. The results of the study indicated that Pakistan was competing in this sector. Maqbool et al., (2021) measured the export competitiveness in the fruit sector of Pakistan by employing several indices of revealed comparative advantage during 2003- 2019. The findings of the analysis illustrated that Pakistan was competitive in the selected time span.

The key objective of the current study is to examine export performance and competitiveness in the meat sector of Pakistani exports in the world market from 2004-2020 by using different indices of RCA. There are only a few valuable studies available in the literature which apply these indices to measure the comparative advantage and competitiveness in the meat exports of Pakistan. This study is a good addition in the literature and will be helpful for the policy makers and researchers to conduct their studies in different sectors of the country. This study, further, will be helpful and beneficial for the policy makers of Pakistan to boost the exports of meat in the world market.

3. Methods and Material

Using numerous indices of revealed comparative advantage, this study used data from the International Trade Center (ITC) for Pakistan’s meat product group 02 from 2004 to 2020 to quantify comparative advantage and competitiveness. The disclosed comparative advantage index was first presented by Liesner (1958), and it was operationalized by Balassa (1965) to examine the CA of the concerned product (Balassa, 1965). The RCA index is defined as the proportion of a country’s exports in a specific product category to its overall goods exports (Balassa and Marcus, 1989).

\[
RCA = \frac{X_{it}/\sum X_{it}}{X_{it}w/\sum X_{it}w}
\]

(Source: Erkan and Kazim, 2014)

Where, \(X_{it}\) = Pakistan’s Meat exports, \(\sum X_{it}\) = Total exports of Pakistan, \(X_{it}w\) = World Meat exports and \(\sum X_{it}w\) = World total exports.

The Balassa index values range from infinity to zero, with 0 indicating no exports and infinity indicating that the concerned product industry is a large exporter when compared to the country's other industries. A bigger than one RCA index value indicates a comparative advantage, or in Balassa’s language, a disclosed comparative advantage (Rivlin, 2000). This study also utilized logarithms to the Balassa index and \(\ln RCA<0\) illustrates comparative disadvantage, while \(\ln RCA>0\) illustrating comparative advantage of Pakistan (Faustino, 2008). The RSCA index is used to deal with the skewness problem. This index is explained in the following way:
\[ RSCA = \frac{RCA-1}{RCA+1} \]  
(Source: Maqbool et al., 2020)

The RSCA index ranges between -1 and +1 and hence avoids the problem of zero values that arises when logarithms are transformed (Maqbool et al., 2020).

Vollrath (1991) produced another index of comparative advantage, which is regarded a more accurate measure of comparative advantage and competitiveness since it eliminates the problem of double-counting in international trade. This index is measured as

\[ \text{RCA}^# = \frac{\left\{ \frac{W_{ij}}{\left( \sum_{j} W_{ij} \right) - W_{ij}} \right\} - \left\{ \frac{\sum_{i} W_{ij} - W_{ij}}{\left( \sum_{i} W_{ij} \right) - W_{ij}} \right\}}{\left\{ \frac{\left( \sum_{i} \sum_{j} W_{ij} \right) - \left( \sum_{i} W_{ij} \right) - \left( \sum_{j} W_{ij} \right) + W_{ij}}{\left( \sum_{i} \sum_{j} W_{ij} \right) - \left( \sum_{i} W_{ij} \right) - \left( \sum_{j} W_{ij} \right) + W_{ij}} \right\}} \]  
(Source: Topcu and Sarigul, 2015)

\( W_{ij} = \) Pakistan’s Meat exports, \( \sum_{i} W_{ij} = \) Pakistan’s total exports, \( \sum_{j} W_{ij} = \) World’s Meat exports and \( \sum_{i} \sum_{j} W_{ij} = \) World’s total exports.

The relative trade advantage index (RTA) has been used to measure the net trade advantage of meat sector of Pakistan in the global market. The gap between relative import advantage index (RMA) and relative export advantage index (RCA) is interpreted as RTA.

\[ RTA = RCA - RMA = \frac{E^I/\sum E^I}{E^W/\sum E^W} - \frac{M^F/\sum M^F}{M^W/\sum M^W} \]  
(Source: Maqbool et al., 2020)

Where, \( M^F_i = \) Meat imports of Pakistan from world, \( \sum M^F_i = \) Total imports of the economy, \( M^W_i = \) Meat imports of world, \( \sum M^W_i = \) World’s total imports.

The revealed competitiveness as an index developed by Vollrath (1991) is the logarithm of both indices, relative import advantage index (LnRMA) and relative export advantage index (LnRCA).

\[ RC = \text{LnRCA} - \text{LnRMA} \]  
(Source: Ignjatijevic et al., 2013)

This study has also employed TBI to determine the specialization of Pakistan’s economy in both imports and exports of meat sector. Lafay (1992) used the index of TBI to measure the comparative advantage. TBI is measured as;

\[ TBI = X-M/X+M \]  
(Source: Sachithra et al., 2014)

4. Results and discussion

This study aims at to measure and examine the export performance and competitiveness in the meat exports of Pakistan by utilizing several indices of RCA from 2004-2020 in the global market.
### Table 1: Various growth rates of export and import related to the Meat export sector from 2004-2020 (US 000$)

<table>
<thead>
<tr>
<th>Years</th>
<th>MEOP</th>
<th>MEOW</th>
<th>TEP</th>
<th>MIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2005</td>
<td>28.91</td>
<td>14.22</td>
<td>27.53</td>
<td>665.8</td>
</tr>
<tr>
<td>2006</td>
<td>51.42</td>
<td>5.881</td>
<td>5.499</td>
<td>272.7</td>
</tr>
<tr>
<td>2007</td>
<td>62.12</td>
<td>16.2</td>
<td>5.348</td>
<td>-6.61</td>
</tr>
<tr>
<td>2008</td>
<td>31.94</td>
<td>25.65</td>
<td>13.68</td>
<td>-55.3</td>
</tr>
<tr>
<td>2009</td>
<td>31.63</td>
<td>-10.82</td>
<td>-13.4</td>
<td>-30.3</td>
</tr>
<tr>
<td>2010</td>
<td>52.46</td>
<td>9.767</td>
<td>21.98</td>
<td>30.64</td>
</tr>
<tr>
<td>2011</td>
<td>35.56</td>
<td>21.55</td>
<td>18.36</td>
<td>63.35</td>
</tr>
<tr>
<td>2012</td>
<td>25.19</td>
<td>-0.661</td>
<td>-2.88</td>
<td>-44.5</td>
</tr>
<tr>
<td>2013</td>
<td>1.525</td>
<td>5.724</td>
<td>2.061</td>
<td>20.36</td>
</tr>
<tr>
<td>2014</td>
<td>1.471</td>
<td>6.157</td>
<td>-1.59</td>
<td>12.43</td>
</tr>
<tr>
<td>2015</td>
<td>22.26</td>
<td>-13.3</td>
<td>-10.7</td>
<td>-6.41</td>
</tr>
<tr>
<td>2016</td>
<td>-9.101</td>
<td>-0.563</td>
<td>-7.04</td>
<td>49.43</td>
</tr>
<tr>
<td>2017</td>
<td>-11.44</td>
<td>9.383</td>
<td>6.545</td>
<td>82.93</td>
</tr>
<tr>
<td>2018</td>
<td>7.719</td>
<td>3.603</td>
<td>8.013</td>
<td>-16.6</td>
</tr>
<tr>
<td>2019</td>
<td>20.25</td>
<td>5.59</td>
<td>0.795</td>
<td>-51.3</td>
</tr>
<tr>
<td>2020</td>
<td>5.3</td>
<td>-0.89</td>
<td>-6.64</td>
<td>-62.6</td>
</tr>
</tbody>
</table>

Sources; Authors own calculations. Where, MEOP= Meat exports of Pakistan, MEOW= Meat exports of World, TEP= Pakistan's total exports and MIP= Meat Imports of Pakistan.

### Table 2: Various Revealed Comparative Advantage Indices related to the Meat export sector from 2004-2020

<table>
<thead>
<tr>
<th>Years</th>
<th>RCA</th>
<th>RSCA</th>
<th>LNRCA</th>
<th>RCA#</th>
<th>RMA</th>
<th>RTA</th>
<th>TBI</th>
<th>RC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>0.19</td>
<td>-0.68</td>
<td>-1.66</td>
<td>0.1891</td>
<td>0.004</td>
<td>0.186</td>
<td>0.949</td>
<td>3.81</td>
</tr>
<tr>
<td>2005</td>
<td>0.19</td>
<td>-0.68</td>
<td>-1.65</td>
<td>0.1902</td>
<td>0.02</td>
<td>0.172</td>
<td>0.731</td>
<td>2.266</td>
</tr>
<tr>
<td>2006</td>
<td>0.3</td>
<td>-0.54</td>
<td>-1.2</td>
<td>0.2984</td>
<td>0.068</td>
<td>0.232</td>
<td>0.446</td>
<td>1.485</td>
</tr>
<tr>
<td>2007</td>
<td>0.46</td>
<td>-0.37</td>
<td>-0.78</td>
<td>0.4578</td>
<td>0.058</td>
<td>0.402</td>
<td>0.638</td>
<td>2.078</td>
</tr>
<tr>
<td>2008</td>
<td>0.49</td>
<td>-0.34</td>
<td>-0.71</td>
<td>0.4885</td>
<td>0.019</td>
<td>0.472</td>
<td>0.861</td>
<td>3.273</td>
</tr>
<tr>
<td>2009</td>
<td>0.65</td>
<td>-0.21</td>
<td>-0.44</td>
<td>0.6442</td>
<td>0.015</td>
<td>0.631</td>
<td>0.924</td>
<td>3.777</td>
</tr>
<tr>
<td>2010</td>
<td>0.9</td>
<td>-0.05</td>
<td>-0.11</td>
<td>0.8984</td>
<td>0.018</td>
<td>0.881</td>
<td>0.934</td>
<td>3.891</td>
</tr>
<tr>
<td>2011</td>
<td>1.01</td>
<td>0.007</td>
<td>0.015</td>
<td>1.0151</td>
<td>0.026</td>
<td>0.989</td>
<td>0.921</td>
<td>3.667</td>
</tr>
<tr>
<td>2012</td>
<td>1.34</td>
<td>0.145</td>
<td>0.292</td>
<td>1.3428</td>
<td>0.014</td>
<td>1.325</td>
<td>0.964</td>
<td>4.542</td>
</tr>
<tr>
<td>2013</td>
<td>1.3</td>
<td>0.131</td>
<td>0.263</td>
<td>1.3044</td>
<td>0.017</td>
<td>1.284</td>
<td>0.958</td>
<td>4.349</td>
</tr>
<tr>
<td>2014</td>
<td>1.26</td>
<td>0.116</td>
<td>0.234</td>
<td>1.2664</td>
<td>0.017</td>
<td>1.247</td>
<td>0.953</td>
<td>4.335</td>
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<tr>
<td>2015</td>
<td>1.73</td>
<td>0.269</td>
<td>0.551</td>
<td>1.7449</td>
<td>0.016</td>
<td>1.718</td>
<td>0.964</td>
<td>4.658</td>
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<tr>
<td>2016</td>
<td>1.65</td>
<td>0.247</td>
<td>0.504</td>
<td>1.6637</td>
<td>0.022</td>
<td>1.632</td>
<td>0.942</td>
<td>4.302</td>
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<td>2017</td>
<td>1.37</td>
<td>0.155</td>
<td>0.313</td>
<td>1.3721</td>
<td>0.035</td>
<td>1.333</td>
<td>0.883</td>
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<tr>
<td>2018</td>
<td>1.45</td>
<td>0.185</td>
<td>0.374</td>
<td>1.4585</td>
<td>0.029</td>
<td>1.424</td>
<td>0.908</td>
<td>3.921</td>
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<tr>
<td>2019</td>
<td>1.72</td>
<td>0.264</td>
<td>0.541</td>
<td>1.7278</td>
<td>0.015</td>
<td>1.702</td>
<td>0.965</td>
<td>4.71</td>
</tr>
<tr>
<td>2020</td>
<td>1.81</td>
<td>0.288</td>
<td>0.592</td>
<td>1.8214</td>
<td>0.006</td>
<td>1.802</td>
<td>0.987</td>
<td>5.764</td>
</tr>
</tbody>
</table>

Sources; Authors own calculations based on ITC.
Table 1 highlights the growth rates of imports and exports of meat of Pakistan in the global market during 2004-2020. The export growth of meat was positive in the selected time span except in the years 2016-2017. Pakistan also imports this product group, but it was a minor share in the domestic demand of meat.

In table 2, the RCA index reveals that Pakistan suffered a comparative disadvantage in the meat export market between 2004 and 2010, while Pakistan had a comparative advantage during the time span 2011-2020 (Sardar et al., 2019). The results of RSCA and LnRCA highlight that Pakistan had a comparative advantage from 2011-2020, whereas it was observed a comparative disadvantage from 2004-2010 in the meat sector (Jawed et al., 2018). The study also observed competitive disadvantage in this sector during 2004-2010 by employing Vollrath index (RCA#), whereas it was seen competitive advantage from 2011-2020. Further, the index of relative import advantage index (RMA) displays that Pakistan had a CA in the import of selected products during 2004-2020. RTA index depicts that Pakistan enjoyed a net-competitive advantage in this sector from 2004-2020. Additionally, the TBI results indicate that Pakistan was a net exporter in the analysed industry. Revealed competitiveness (RC) index demonstrates that Pakistan had a revealed competitiveness in the meat export during the selected time span.

5. Conclusion and Policy Recommendations

The purpose of this study is to examine export performance and competitiveness in the meat export sector of Pakistan in the world. This study collected the data from International Trade Center (ITC) from 2004-2020. The study employed several indices of revealed comparative and competitive advantages such as RCA, LnRCA, RSCA, RCA#, RMA, RC, RTA and TBI to measure competitiveness in this export sector. The results of RCA index illustrate that Pakistan had a comparative disadvantage in the meat export sector during 2004-2010, while Pakistan had a comparative advantage during the time span 2011-2020. The results of RSCA and LnRCA highlight that Pakistan had a comparative advantage from 2011-2020, whereas it was observed a comparative disadvantage from 2004-2010. The study also observed competitive disadvantage in this sector during 2004-2010 by employing Vollrath index (RCA#). Moreover, the index of RMA displays that Pakistan was competitive in the import of these products from 2004-2020. RTA index depicts that Pakistan enjoyed a net-competitive advantage in this sector during the analysis. Additionally, the TBI results indicate that Pakistan was a net exporter in the analysed industry. Revealed competitiveness (RC) index exemplifies that Pakistan had a revealed competitiveness in the meat export during the selected time span. The government of Pakistan should develop a policy in consultation with the meat exporting and processing companies to encourage vertical integration in the value chain. The government may adopt these steps such as establishing disease free zones, land acquisition, breeds for beef, financing herd expansion, international investments and export restrictions on animal feed to enhance the export volume of this product group for foreign exchange earnings.

References


economic review, 10(4), 731-753.