

Competitiveness in Indian Agricultural Exports

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Abstract

In this paper, an attempt has been made to decompose growth of India's agricultural exports four components: a global component (GLOBO) indicating changes due to overall growth of world trade, a geographical component (GEO) indicating changes due to the country's distribution of trading partners, a product composition component (COMPO) indicating growth due to the mix of products exported, and a residual term indicating changes in competitiveness or performance (PERFO). The most used method, i.e, Shift-Share Analysis is used to break down total change of economic indicators into various components to identify underlying sources of growth or decline. This paper analyzes the change in shares of India's agricultural exports for two time periods- 2003-2010 and 2011-2018. Our analysis suggests, a decline in competitive of agriculture export in the latter period. While several pro-active measures have been taken by the Govt. to increase agriculture export, the most fundamental challenge lies in increasing competitiveness in this sector. Competitiveness in agricultural export is further dependent on both endogenous factors, like, geographic location, government policies etc and some are exogenous factors, like quality of produce, standardization etc. It is essential that the first and foremost focus of the government should be to address all factors that enhance competitiveness of agriculture export.

Keywords: *Agricultural Exports, Constant Market Share, Competitiveness*

Introduction

India has remained consistently a net exporter of agricultural products since economic reforms began in 1991. In 2018, India's exports in agricultural goods amounted to USD 32.6 Billion¹ and imports in agricultural goods amounted to USD 27.3 Billion². Government of India, introduced a comprehensive Agriculture Export Policy with the vision of -"Harness export potential of Indian agriculture, through suitable policy instruments, to make India a global power in agriculture, and raise farmers' income." One of the objectives of India's Agricultural Export Policy is to double agricultural exports from present USD 35+ billion to USD 60+ billion by 2022 and reach USD 100 billion in the next few years thereafter, with a stable trade

¹ Source: UNCOMTRADE

² Source: UNCOMTRADE

policy regime. However, the growth in agricultural exports has been far from adequate. To achieve target of 60 billion, annual growth in the next 2 years required is about 31% which means a humungous task ahead. Moreover, the relative importance of agricultural exports within the economy has also seen a significant downturn. For instance, agricultural exports accounted for 44 percent of total exports in 1960 decreased to 15.5 percent in 1988 and then 10 percent in 2018.

One of the key reasons why agricultural export failed to translate growth in farm income is its inability to diversify agricultural export market from primary agricultural commodities to high valued processed food. About 20% of our agricultural export is rice while high valued commodities, like, fruits or processed fruits accounts for mere 3-4% of total agricultural exports. Poor storage capacities, highly competitive fruits markets, phytosanitary requirements etc., have limited the export of fruits or any other high valued commodities. For similar reasons, diversification of agriculture export market is also limited to only developing countries or so-called "Global South" which are by themselves subject to various economic risks. For instance, in 1990, India's major agricultural export partners were Soviet Union, United States, United Kingdom, Saudi Arabia and Japan. In 2018, India's major agricultural-export destinations were Vietnam, United States, UAE, Bangladesh, Iran, Saudi Arabia, China, Indonesia and Malaysia. In addition, competitiveness of agricultural exports is also increasing as many developing countries moving towards favorable agricultural trade policy.

Our objective, in this paper is to measure the relative contribution of competitiveness and structural factors to export performances using a commonly use statistical method, Constant Market Share Analysis. Rest of the paper is organized in the following manner - In the following section we review the existing literature on the different approaches used to study the export performances. In the subsequent section we discuss the statistical method used to evaluate the influence of structural factors on export growth and market share. Section 4 discusses the results and section 5 concludes the paper.

Literature Review

Vast literature exists on agricultural exports performance, competitiveness and factors leading to export growth. The World Bank has developed a thematic group on export competitiveness which advocates a framework based on the following three complementary elements:

- **Incentive Framework** - Resources must be allocated to firms that have the capacity to compete internationally in the long run, and the most productive firms.
- **Reducing Trade Related Costs** - this includes physical infrastructure and complementary services related to trade as well as policies related to trade, as well as policies related to the supply of capable workers
- **Overcoming Market and Government Failures** - a holistic approach to mitigate weak capacity through building institutional quality in areas such as export promotion, innovation and transparency of govt. procedure.

Selected literature on India's agricultural export performance is highlighted below:

- **Jagdambe (2016)** attempted to assess India's trade intensity as well as the Revealed Comparative Advantage (RCA) of the agricultural sector with respect to trade with ASEAN

(Association of South-East Asian Nations) at the aggregate and disaggregate levels. The study found that India's export intensity in total agricultural trade was increasing with respect to ASEAN rather than with the rest of the world. Import Intensity in the same period was found to decline. It was also noticed that the comparative advantage was decreasing gradually throughout the study period although the pattern of India's comparative advantage in export of agricultural products with ASEAN varied from one commodity to another.

- **Shinoj and Mathur (2008)** ascertained the changes in comparative advantage status of India's major agricultural exports vis-à-vis other Asian players during the post reforms period (1991-2004). It has been found that in exports of certain commodities like cashew and oil meals, India has been able to maintain its comparative advantage but several others like tea, coffee, spices etc. has been adversely impacted. India has been found losing out its comparative advantage in export of some of its agricultural commodities to other Asian competitors during the period after economic reforms.
- **Sharma and Bugalya (2014)** estimated the comparative advantage in cotton production and cotton export diversification by calculation of various indicators. Results show that India attained comparative advantage in production and export of cotton in recent years. The study highlights that USA has 14 percent share in world production. However, its share in world export is 38 percent. USA exports 86 percent of cotton production to other countries. The cost of producing cotton is highest in USA, which is 4.5 to 6 times higher than India. During 1995-2010, USA has given about \$37 billion to cotton producers through various programmes like counter-cyclical payments, decoupled income, commodity certificates etc. Despite high cost of cotton production, USA is enjoying artificial comparative advantage in cotton market due to high level of domestic support given to farmers and big corporation in USA.
- **Ohlan and Pal (2006)** analyze the competitiveness of Indian agriculture in the WTO regime. The efficiency indicators at exportable hypothesis indicate that in the emerging liberalized farm trade order, India's export competitiveness is much better in commercial crops. To generate adequate exportable surplus, India must maintain and enhance its production efficiency. The technology upgradation and infrastructure development are key domestic measures for enhancing competitiveness of Indian agriculture.

Several methods have been used by the researchers to identify the factors that influence export performance. Some of the methods are discussed below:

- **Gupta, 2014** studied Indian export of cereals and dairy products using Constant Market Share (CMS) Analysis to explore the changes in trade pattern in agriculture through changes in the general import demand, commodity composition and competitiveness effect of exports. The first component which explains the general rise in exports. It assumes that whether the exports of India have risen at the same pace as the world imports to a particular country. Second effect explains the diversification in commodity composition, like in cereals according to HS code system there are more than 16 products at 6-digit level but India exports to Iran is only 2 products whereas Iran imports the other products under cereals HS code from other countries. This is a commodity composition effect. The residual is explained by the competitiveness effect).

- **Ecel et al, 2014** established the comparative export performance of Uganda's main agricultural exports using Shift Share Analysis (SSA) methodology, where Uganda's agricultural trade was decomposed into four components (i.e. Global Component, Geographical component, Product Composition Component and the Performance Component). The study focused on the top agricultural exports that contribute an average of 35 percent of the nations export earnings, thus Coffee, Refined Sugar, Tobacco, Black tea, Palm oil and Vegetable fats & oils. These products were studied at the 6-digit HS level. The findings revealed that although Uganda gained market share for its main agricultural exports, such growth was marginal, and that much of the agricultural export earnings were dominated by one agricultural commodity.
- **Sharma and Gulati (2003)** attempted to empirically map the competitiveness of Indian Dairy Sector over the period 1975-2000. The study suggests policy options for international trade negotiations and most importantly, domestic policy reforms, given India's commitments to WTO. As measures of global competitiveness, the authors use Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Effective Subsidy Coefficient (ESC) and suggest that, on an average, Indian dairy sector is competitive only if the export subsidies on dairy products by developed countries in general and the USA and the EU in particular are abolished.
- **Deepika, M.G. (2017)** examined the changing patterns of international trade in plantation commodities and analyzed the factors contributing to or retarding the competitiveness of plantation commodities in India. The study used the ratio of unit export prices (f.o.b) to examine the performance of select plantation commodities in India. From the analysis of unit export price ratios of select four commodities, coffee, tea, cashew and pepper, it was seen that price performance in international markets has been good only for cashew. However, the sector currently depends heavily on imports of raw cashew which calls for measures to boost the domestic production within the country.

Data and Methodology

This study is based on Constant Market Share (CMS) Analysis to evaluate the influence of structural factors on export growth and market share. In practice, this involves breaking down the variations of a country's total exports or aggregate market share over time. This decomposition technique owes its success to the simplicity of its application and to its capacity to emphasize structural factors that often tend to be overlooked in the analysis. Tyszynski (1951) was the first to apply CMS analysis to the study of exports. Other most influential studies based on this approach are Leamer and Stern (1970), Richardson (1971), Magee (1975), Fagerberg and Sollie (1987). The analysis starts with an accounting identity to which a decomposition formula is applied. It is also known as Shift-Share Analysis (SSA). The growth of a country's exports can be partly explained by the overall growth of world trade, by the country's particular mix of trading partners, or by the products that it exports predominantly. When the obvious and easily measurable sources of trade growth have been accounted for, the remaining variation in the data is captured by a residual term. This residual includes all factors that might otherwise influence the growth of exports, but it is usually interpreted as an indicator of competitiveness.

The key assumption when applying Shift-Share analysis (SSA) to international trade is that, if a country's export competitiveness does not change and all other factors influencing its exports are held constant; this country's share in world trade should remain constant over time as well. Alternatively, any changes in the country's exports that cannot be accounted for by major explanatory factors such as global trade growth, the mix of trading partners or the product composition of traded goods can be interpreted as a change in competitiveness. The constant market share assumption justifies our decomposing the growth of exports into the following four components: a global component (GLOBO) indicating changes due to overall growth of world trade, a geographical component (GEO) indicating changes due to the country's distribution of trading partners, a product composition component (COMBO) indicating growth due to the mix of products exported and a residual term indicating changes in competitiveness, or performance (PERFO). The first three components-GLOBO, COMPO, GEO relate to what the change in trade would be if trade changes proportionally. The fourth and residual component, PERMO, refers to the trade that "shifts away" from expected proportional changes, hence the term "Shift Share Analysis"

In this paper, we have used the Shift Share Analysis on Agricultural commodities (as defined by WTO) in the Indian context. The trade data has been taken from UNCOMTRADE Database for two time periods 2003-2010 and 2011-2018. The choice of time period is on the basis of growth in exports. Average annual growth in export during 2003 to 2010 was around 16 percent which was similar to the growth attained just after the economic reforms of 1991. The key pillars of economic reforms were liberalization, privatization and globalization which was expected to bring more competition in the agriculture sector. Further, focus on increasing productivity has also led to higher growth in export during this period. However, post 2010, growth in agricultural export slowed and during the period 2011 to 2018, average annual growth in export was around 5 percent. Therefore, the objective of our analysis is to identify the factors that have led to the growth in agricultural exports in these two time periods. Consequently, the exports growth of India's agricultural commodities can be written as the sum of four terms. (For further details of the Methodology, see Annexure I).

$$\Delta\text{GLOBAL} + \Delta\text{SECTORAL} + \Delta\text{GEOGRAPHICAL} + \Delta\text{RESIDUAL} = \Delta\text{TOTAL EXPORTS}$$

$$(_ \%) \quad + (_ \%) \quad + (_ \%) \quad + (_ \%) \quad = 100\%$$

Results and Discussion

The results of the analysis are presented for two time periods. The four components that explains the change in agricultural export during the 7 years period, i.e., 2003 to 2010 is illustrated below:

For Time-Period I (2003-2010),

$$\text{Total Change in agriexport} = \text{GLOBO} + \text{COMPO} + \text{GEO} + \text{PERFO} \text{----- (i)}$$

$$14.7 = 6.7 + 3.5 + 1.7 + 2.7; \text{ (Unit of Measurements: USD billion) -----(ii)}$$

$$100\% = 45.7\% + 24.05\% + 12.08\% + 18.17\% \text{-----(iii)}$$

The CMS for period I, suggests that the total change in India's agricultural exports was largely explained by the global behavior in agriculture export. Nevertheless, all the four components in the analysis was found to have a positive effect on growth of agricultural export during this period. The first component GLOBO, i.e., growth in world trade of agricultural commodities contributed 46% to the change in agricultural exports. The second component-COMPO which represents the global demand for agri commodities exported from India contributed 24 percent to the growth in agricultural export. This period (2003-2010) saw a significant diversification towards varies agricultural commodities. Rice which constituted about 20% of total agriculture export dropped to 10% in 2011. Global demand for Indian varieties of fruits and vegetables, groundnut also contributed to the growth in agriculture export. The third component -, i.e., GEO explaining the respective behavior of the 10 individual partners contributed 12% to the growth in share of export. The geographical effect represents that part of the total change in exports which would have been due to the importing behavior of the various trading partners at the global level. The import share of India remains at 1% of the global imports of agricultural commodities by all the trading partners under consideration in 2003 as well as 2010. The individual import share increased from 2003 to 2010 for many trading partners under consideration. For instance, the share of India in global imports of agricultural commodities by China increased from 0.52% in 2003 to 3.50% in 2010. Also, the share of India in global imports of agricultural commodities by Saudi Arabia, UAE and Vietnam is 8.68%, 15.72% and 9.41% respectively in 2010.

The remaining effect of 18.2% can be explained due to gains of competitiveness.

For Time-Period II (2011-2018),

$$\text{Total Change in agriexport} = \text{GLOBO} + \text{COMPO} + \text{GEO} + \text{PERFO} \text{----- (iv)}$$

$$1.6 = 3.1 - 2.2 + 0.96 - 0.29 \text{ (Unit of Measurements: USD billion) ----- (v)}$$

$$100\% = 197.18\% - 138.94\% + 59.93\% - 18.17\% \text{----- (vi)}$$

In this period, the overall change in agriculture export (eqn v) was much lower as compared to the change in the first phase (eqn ii). CMS analysis suggests that the positive factor influencing agricultural export during the period 2011 to 2018 was the overall growth in global trade which contributed almost 197% to the change in share of agriculture export. This is supposedly due to the positive total agricultural exports behavior of all the countries together. The other positive factor influencing share of agricultural export during this period was respective behavior of the 10 individual partners which contributed 60% to change in agri export share. In this time period as well, the import share of India remains at 1% of the global imports of agricultural commodities by all the trading partners. For instance, the share of India in global imports of agricultural commodities by Saudi Arabia and UAE is 8.72% and 10.47% respectively in 2010. However, diversification in agricultural export that had led to the gain in market share during 2003 to 2010 was lost in the second phase. During 2011 to 2018, the COMPO negatively contributed to the change in agri export share, i.e., the share of exports "lost" due to global behavior of agricultural sector. Competitiveness of agriculture sector declined and about 18% was "lost" due to losses of competitiveness. Hence, by isolating the global, product or sectoral and geographical effect, the results indicate that along with

other unknown factors, India was not competitive enough (or export-oriented enough) to be able to increase its exports in line with other partners, and therefore lost market shares.

Conclusion

Our analysis suggests that with globalization and trade liberalization, India received some initial gains. During 2003 to 2010, agriculture sector was growing to be competitive and therefore, significantly contributed to the growth in share of agriculture export. However, it could not sustain long and during 2011 to 2018, agriculture sector became less competitive and therefore lost market share. Several measures have been taken by the government to promote agriculture export. Export promotion via the development of export and trading houses as well as effective liberalizing export promotion zone schemes for agriculture are fairly recent measures. Other possibilities such as agro-industry parks have also opened up for promoting exports. However, the full impact of globalization and economic reforms is possible when we produce agro commodities which are globally competitive. Standardization and quality of produce will be the key to enhance competitiveness in agriculture sector.

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Annexure I

Methodology

• Definitions and Assumptions

Before proceeding, we need to introduce some notation conventions and establish a number of definitions.

Let,

V_i = the value of country A's exports of product i in period 1

V'_i = the value of country A's exports of product i in period 2,

$V_{.j}$ = the value of country A's exports to country j in period 1,

$V'_{.j}$ = the value of country A's exports to country j in period 2,

V_{ij} = the value of country A's exports of product i to country j in period 1,

V'_{ij} = the value of country A's exports of product i to country j in period 2,

r = percentage change in world exports between periods 1 and 2,

r_i = percentage change in world exports of product i between periods 1 and 2, and

r_{ij} = percentage change in world exports of product i to country j between periods 1 and 2.

Note: All of the above definitions apply to a single reporting country. Here, it refers to India, i refers to agricultural commodity i . India's top ten trading partners of agricultural commodities are taken for the analysis³. In this paper, two time periods are taken for comparison (2003-2010 & 2011-2018). Therefore, according to the above definitions, period 1 refers to 2003 & 2011 and period 2 refers to 2010 & 2018.

The above definitions imply that

$$\sum_j V_{ij} = V_i.$$

and

$$\sum_i V_{ij} = V_{.j}$$

in period 1, with similarly results holding in period 2 with the addition of a prime symbol. In words,

We can obtain country A's total exports of good i by summing V_{ij} over all trading partners, which are

³ The trading partners of India taken for the analysis are: Bangladesh, China, United States, Vietnam, Indonesia, European Union, United Kingdom, United Arab Emirates, Saudi Arabia and Japan.

indexed by j . Similarly, by summing V_{ij} over all products using the i index produces total exports of country A to country j .

Country A's total merchandise exports can be obtained by aggregating over all products i and all Partner countries j , as follows:

$$\sum_i \sum_j V_{ij} = \sum_j V_{\cdot j} = \sum_i V_i = V_{\cdot}$$

The above expression says that total merchandise exports can be obtained in one of three ways. First, by privileging a product composition approach, and having already calculated total exports of each product i by country A, we can simply add all of these figures together to get total merchandise exports (i.e. $\sum_i V_i$).⁴ Second, focusing on geographical aspects, after we have already calculated total exports of country A to each country j for all of A's trading partners, we can then aggregate these figures over all partners (i.e. $\sum_j V_{\cdot j}$). Finally, we can also aggregate the V_{ij} values directly over all products i and all partners j using double summation ($\sum_i \sum_j V_{ij}$). All three approaches should produce the same figure for total merchandise exports, but one or the other may be more convenient if all products or all partners have already been calculated. Deriving total exports in more than one way also provides a useful check on the accuracy of calculations.

- **Decomposing the Total Change**

If all countries were similar, each would grow exactly at the same global rate. Thus, the difference between countries can be measured by the gap with the global rate. In particular, if the change in country's A exports attributable to global trade growth is denoted by rV i.e. country A's total merchandise exports in period 1 multiplied by the growth rate of world trade, then we have the following identity:

$$V'_{\cdot} - V_{\cdot} \equiv A rV + (V'_{\cdot} - V_{\cdot} - rV_{\cdot})$$

This equation has an interesting interpretation. It says that the change in country A's exports is equal to the change due to world trade growth (GLOBO) plus a residual represented by the term in parenthesis. If country A experienced no change in either its product composition, partner mix or export competitiveness between period 1 and period 2, then the constant share assumption implies that this residual would be equal to 0. The likelihood of such an event in the real world is extremely small because these variables are changing frequently- and sometimes quite substantially- which can result in either positive or negative residuals depending on whether the shifts are favourable or unfavourable for exports. In this identity, exports are not differentiated by product. If we are indeed interested in a particular class of goods, then the following is an equivalent statement for product i only:

⁴Here, we have taken agricultural merchandise commodities.

$$V'_i - V_i = r_i V_i + (V'_i - V_i - r_i V_i)$$

This expression is valid for each product and can be aggregated across the product range, then combined with the previous equation as follows:

$$V'_{..} - V_{..} = \sum_i (V'_i - V_i) = \sum_i r_i V_i + \sum_i (V'_i - V_i - r_i V_i)$$

Rearranging the first term, we obtain

$$V'_{..} - V_{..} = r V_{..} + \sum_i (r_i - r) V_i + \sum_i (V'_i - V_i - r_i V_i)$$

(1) (2) (3)

This indicates that changes in total exports from a given country can be decomposed in changes due to global trade growth (1), the fact that world trade in the products that it exports is growing faster (or more slowly) than overall world trade (2), plus a residual (3). The second term above is the COMPO effect mentioned earlier.

Further distinguishing country A's exports by trading partner results in the following decomposition:

$$V'_{ij} - V_{ij} = r_{ij} V_{ij} + (V'_{ij} - V_{ij} - r_{ij} V_{ij})$$

and aggregating over all products and partners results in our final decomposition of export growth.

$$V'_{..} - V_{..} = \sum_i \sum_j r_{ij} V_{ij} + \sum_i \sum_j (V'_{ij} - V_{ij} - r_{ij} V_{ij})$$

$$= r V_{..} + \sum_i (r_i - r) V_i + \sum_i \sum_j (r_{ij} - r_i) V_{ij} + \sum_i \sum_j (V'_{ij} - v_{ij} - r_{ij} V_{ij})$$

(1) (2) (3) (4)

As before, the first two terms on the right hand side of the equation represent the change in country A's exports due to the growth of world exports (1) and due to the mix of products exported (2). The third term represents now the market distribution of the country's exports i.e. a "geographic" or "partner" effect (3). This is the GEO component discussed previously. The fourth and last term is a residual indicating "competitiveness" or "performance" (4). This is the PERFO component.

Accordingly, it is helpful to normalize by dividing by $V_{..}$, so that the GLOBO, GEO, COMPO and PERFO components add up to the percentage growth of exports. Thus we obtain the decomposition in four terms:

$$\text{Exports' Growth} = \text{GLOBO (1)} + \text{COMPO (2)} + \text{GEO (3)} + \text{PERFO (4)}$$