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## Evaluating Indian Steel Industry's Trade Competitiveness Based on RCA Index

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**ABSTRACT**

*Steel is one of the most important pillars to the Infrastructural development of any nation. The rate of production and consumption of steel is treated as an important index of the level of socioeconomic development and standard of living of the people in any country. India stands at the 3rd position as a producer of crude steel in the world and this Industry is an important Foreign exchange Contributor to the economy. Since Iron and steel products are Imported and Exported liberally as per the existing policy and therefore it becomes necessary to analyse and evaluate the export potentials and competitiveness of the Indian Iron and steel industry in relation to the steel exports of the world as a whole. This study analyses the competitiveness and the pattern of trade flows/trade specialisation from India to world, particularly for Iron and Steel industry. Our research is mainly based on the measures of Revealed Comparative Advantage (RCA) measures or Balassa Index.*

**Keywords:** Steel, Revealed Comparative Advantage (RCA) measures, Balassa Index.

**INTRODUCTION**

Steel is fundamental to the development of any nation. The level of per capita consumption and production of steel is treated as an important index of the level of socioeconomic development and standard of living of the people in any country. It is an important product of a large and technologically complex industry having very strong forward and backward linkages in terms of material flows, production, consumption and income generation. That is the reason why, all major industrial economies are characterized by the existence of a strong Iron and Steel Industry and the growth of many of these economies has been largely shaped by the strength of their steel industries in their initial stages of development. Iron and Steel Industry was further developed in the process of liberalization.(Kavitha & Palanivelu, 2014) The Indian steel industry has entered into a new development stage from 2007-08, riding high on the resurgent economy and rising demand for steel. Rapid rise in production has resulted in India becoming the 3 rd largest producer of crude steel in 2015 and the country continues to be the largest producer of sponge iron or DRI in the world. As per the report of the Working Group on Steel for the 12th Five Year Plan, there exist many factors which carry the potential of raising the per capita steel consumption in the country. These include among others, an estimated infrastructure investment of nearly a trillion dollars, a projected growth of manufacturing from current 8% to 11-12%, increase in urban population to 600 million by 2030 from the current level of 400 million, emergence of the rural market for steel currently consuming around 10 kg per annum buoyed by projects like Bharat Nirman, Pradhan Mantri Gram Sadak Yojana, Rajiv Gandhi Awaas Yojana among others. (Ministry of Steel, n.d.)

Iron and steel products are importable liberally as per the existing policy. Advance licensing scheme allow duty free import of raw material for export. Iron and steel are freely exportable. Table.1 shows that over a period of five years there has been an increase in Export of Total finished Steel by 1.95 million tonnes.

| Table.1.Indian steel industry: Exports (in million tonnes). |         |         |         |         |         |
|---|---------|---------|---------|---------|---------|
| Category  | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
| Total Finished Steel (alloy + non alloy)                    | 3.64    | 4.59    | 5.37    | 5.98    | 5.59    |
| Source: Joint Plant Committee                               |         |         |         |         |         |

International trade thrives on the comparative advantage that economies offer, as proactive players in the world market. While Ricardo laid down the basic tenets of comparative advantage, Balassa (1965)

developed the concept of revealed comparative advantage (RCA). The term thus connotes the idea, that countries specialize and export items, which they can produce at lower cost in comparison to the world. In Balassa's (1986) view, the comparative advantage that a country enjoys primarily depends on its physical and human capital endowments. Moreover, trade orientation also impacts an economies advantage, vis-à-vis the other countries. Hence, as a country traverses the road to development, its comparative advantage is expected to 'shift'. Accumulation of human and physical capital and a change in the trade policies alters the comparative advantage of the various sectors of the economy. (Burange & Chaddha, 2008)

### Objectives

The main objectives of the paper are:

1. To analyze the pattern of trade flow of Iron and Steel industry of India and the World.
2. To study the Revealed Comparative Advantage Index of Indian Iron and steel exports in relation to the total steel export of world.

### Conceptual Framework and Review of Literature

In today's competitive world, to measure the export performance has gained quite a momentum. The available research techniques are very much diversified in terms of methodology and empirical approaches in attempts to draw conclusions regarding export performance (Zou & Stan, 1998). Comparative advantage measure is determinant of trade pattern which leads to the international trade specialization and to be determined by several supply and demand factors. Comparative advantage will increase the efficiency of scarce resources and welfare (Ana Shohibul, 2013). It is based on the Ricardian comparative advantage concept.(Wikipedia RCA, n.d). Some of the works published in this area are the "Empirical Analysis of Agricultural Exports Competitive of Henan Province"(Springer Link, 2015); Revealed Comparative Advantage Measure: ASEAN-China Trade Flows (Ana Shohibul, 2013); Evaluation of International Competitiveness Using the Revealed Comparative Advantage Indices: The Case of the Baltic States (Pilinkiene, 2014) "Determinants of revealed comparative advantages: the case of cheese trade in the European Union"(Balogh & Jámor, n.d.).

In various research papers, the researchers have made an attempt to analyze the trade competitiveness of one country over the other and concludes that if  $RCA < 1$ , this does not prove the weakness of the industry in comparison to that of the world whereas if  $RCA > 1$  there is a Revealed Comparative Advantage of the concerned commodity of that country over world.

### Methodology

An empirical approach is adopted under study. For the purpose of analysis, data and information is obtained from secondary sources. All data is collected from WTO databank. The researcher has used data of past 10 years (2005 to 2014) for the study purpose, which includes Total Steel Exports from India to World (ISEW), Total Exports of all commodities from India to World (IAEW), Total Steel Exports of the World to world (WSEW) and Total Exports of all commodities of the World to World (WAEW). The study undertakes a period of 10 years starting from 2005 till 2014 because the relevant figures for 2015 were not available at the time of the analysis and are not reported here.

The data is analyzed with the help of 'Revealed Comparative Advantage'. It is an index used in international economics for calculating the relative advantage or disadvantage of a certain country in a certain class of goods or services as evidenced by trade flows. It is based on the Ricardian comparative advantage concept.(Wikipedia RCA, n.d). It is used in international economics to calculate the relative advantage or disadvantage of a certain country in a certain class of goods or services. Measures of revealed comparative advantage (RCA) have been used to help assess a country's export potential.(Trade Indicators, n.d).RCA most commonly refers to an index introduced by Béla Balassa (1965):

$$RCA = (e_{ij}/e_{it}) / (e_{nj}/e_{nt})$$

Where:

|   |                                       |
|---|---------------------------------------|
| E | Exports                               |
| I | country index                         |
| N | set of countries/ world               |
| j | commodity index                       |
| T | set of commodities/ Total commodities |

A comparative advantage is “Revealed” if  $RCA > 1$ . If  $RCA$  is less than unity, the country is said to have a comparative disadvantage in the commodity or industry. (Wikipedia RCA, n.d)

For the study abbreviations used for data in the above equation are as:

- ISEW - India Steel Export to World(eij)
- IAEW - India All Commodity Export to World (eit)
- WSEW- World Steel Export to World (enj)
- WAEW - World All commodity Export to World (ent)

**Hypothesis**

1. There is no revealed comparative advantage in steel exports for India over the total steel exports of the world.

**Data analysis**

The calculation of the RCA index was carried out by applying the data of Indian iron and steel exports and World’s iron and steel exports. Analyzing the trend of export data it was concluded that Indian export of steel have continued to grow till 2008 and there was a sharp decline in 2009 which was recovered well in 2010 and throughout the selected period. This is revealed in the following table 2:

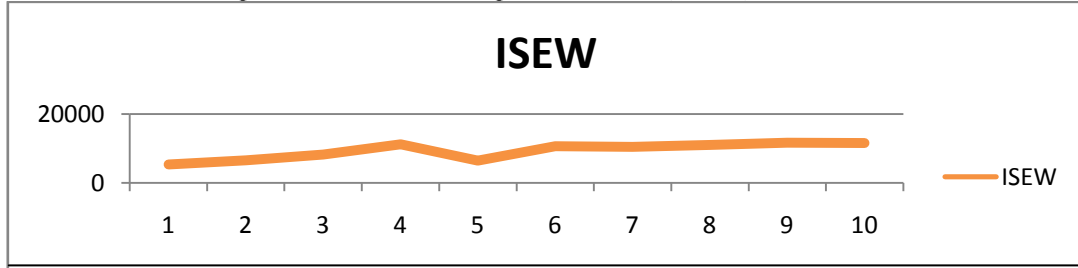
Table 2: Indian Export of Iron and Steel to World. US dollars (million)

| 2005 | 2006 | 2007 | 2008  | 2009 | 2010  | 2011  | 2012  | 2013  | 2014  |
|------|------|------|-------|------|-------|-------|-------|-------|-------|
| 5364 | 6582 | 8194 | 11217 | 6471 | 10612 | 10471 | 10990 | 11671 | 11550 |

source: <http://stat.wto.org/StatisticalProgram/WSDDBStatProgramSeries.aspx?Language=E>

It can be observed that there has been an enormous increase in exports of the steel from India in the past 10 years, as shown in table 2. The total exports have gone from 5364 to 11550. i.e an overall increase of 115.32% from 2005 to 2014.

Graph of India's Steel Export to World (ISEW) 2005-2014:



Source: Prepared by researcher on the basis of table no.2

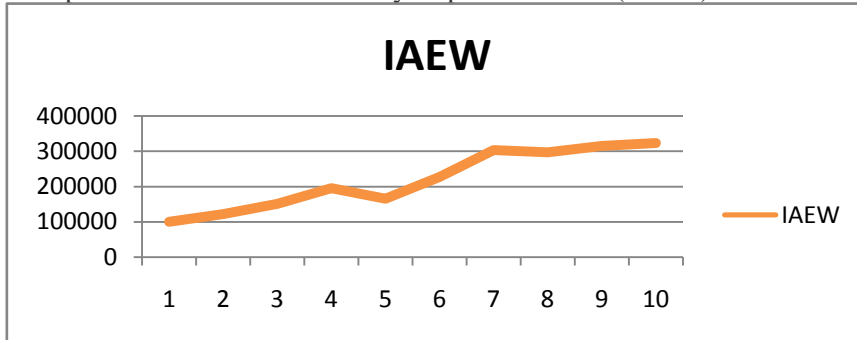
Table 3. Indian Export of All Commodities to World. US dollars (million)

| 2005  | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   | 2012   | 2013   | 2014   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 99616 | 121808 | 150159 | 194828 | 164909 | 226351 | 302905 | 296828 | 314848 | 322694 |

<http://stat.wto.org/StatisticalProgram/WSDDBViewData.aspx?Language=E>

It can be observed that there has been an enormous increase in exports of the total commodity from India in the past 10 years, as shown in table 3. The total exports have gone from 99,616 to 322,694 which show an overall increase of 223.93% from 2005 to 2014.

Graph of India's All Commodity Export to World (IAEW) 2005-2014:



Source: Prepared by researcher on the basis of table no.3

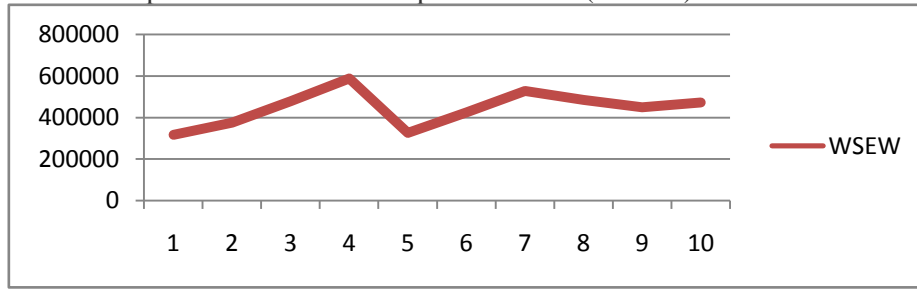
Table 4. World's Export of Iron and Steel to World. US dollars(million)

| 2005   | 2006   | 2007   | 2008   | 2009   | 2010   | 2011   | 2012   | 2013   | 2014   |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 316419 | 374729 | 478864 | 587930 | 326121 | 423947 | 528109 | 484872 | 449477 | 471650 |

Source : <http://stat.wto.org/StatisticalProgram/WSDDBStatProgramSeries.aspx?Language=E>

It can be observed that there has been a little increase in exports of the Steel from world in the past 10 years, as shown in table 4. The total exports have gone from 316,419 to 471,650. i.e an overall increase of mere 49% from 2005 to 2014.

Graph of World's Steel Export to World (WSEW) 2005-2014:



Source: Prepared by researcher on the basis of table no.4

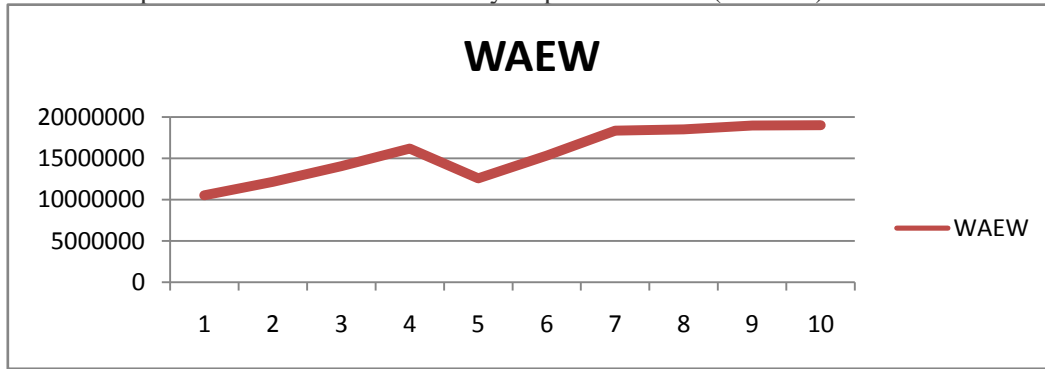
Table 5: World's Export of All Commodity to World US dollar (Millions)

| 2005     | 2006     | 2007     | 2008     | 2009     | 2010     | 2011     | 2012     | 2013     | 2014     |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10509000 | 12131000 | 14023000 | 16160000 | 12555000 | 15301000 | 18338000 | 18496000 | 18948000 | 18995000 |

Source : <http://stat.wto.org/StatisticalProgram/WSDDBStatProgramSeries.aspx?Language=E>

It can be observed that there has been an enormous increase in exports of the total commodity from world in the past 10 years, as shown in table 5. The total exports have gone up from 10509000 to 18995000 i.e an overall increase by 80.74% from 2005 to 2014.

Graph of World's All Commodity Export to World (WAEW) 2005-2014:



Source: Prepared by researcher on the basis of table no.5

On the basis above available data ,the researcher has calculated the RCA index which is shown below in table no.6

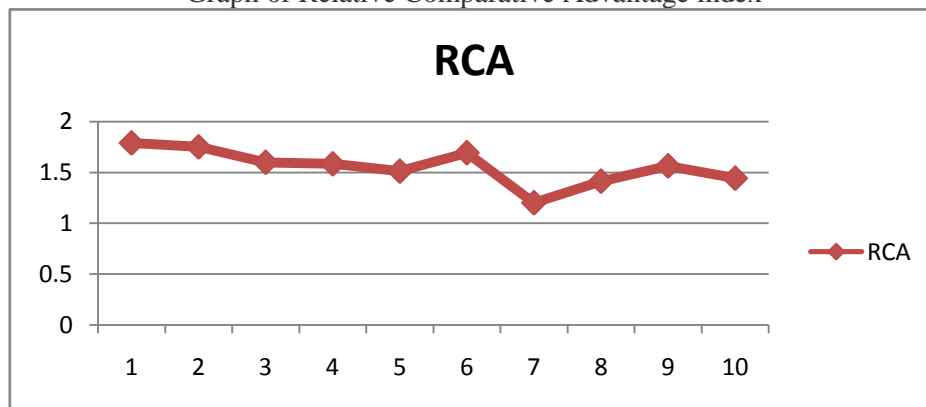
Table 6 showing calculation of RCA

| Years | WSEW   | WAEW     | ISEW  | IAEW   | WSEW/WAEW | ISEW/IAEW | RCA     |
|-------|--------|----------|-------|--------|-----------|-----------|---------|
| 2005  | 316419 | 10509000 | 5364  | 99616  | 0.030109  | 0.053847  | 1.7883  |
| 2006  | 374729 | 12131000 | 6582  | 121808 | 0.03089   | 0.054036  | 1.7492  |
| 2007  | 478864 | 14023000 | 8194  | 150159 | 0.034148  | 0.054569  | 1.5979  |
| 2008  | 587930 | 16160000 | 11217 | 194828 | 0.036382  | 0.057574  | 1.58249 |

|      |        |          |       |        |          |          |        |
|------|--------|----------|-------|--------|----------|----------|--------|
| 2009 | 326121 | 12555000 | 6471  | 164909 | 0.025975 | 0.03924  | 1.5106 |
| 2010 | 423947 | 15301000 | 10612 | 226351 | 0.027707 | 0.046883 | 1.6920 |
| 2011 | 528109 | 18338000 | 10471 | 302905 | 0.028799 | 0.034569 | 1.2003 |
| 2012 | 484872 | 18496000 | 10990 | 296828 | 0.026215 | 0.037025 | 1.4123 |
| 2013 | 449477 | 18948000 | 11671 | 314848 | 0.023722 | 0.037069 | 1.5626 |
| 2014 | 471650 | 18995000 | 11550 | 322694 | 0.02483  | 0.035792 | 1.4414 |

Source: self developed

Graph of Relative Comparative Advantage index



Source: Prepared by researcher on the basis of table no.6

**Interpretation**

The first objective is achieved by doing the trend analysis of the above computed tables and RCA index. On computing the RCA index in table 6, it was discovered that the RCA index has subsequently fell under the study period till 2009, later on it improved but rate at which it was improving is not satisfactory. It was 1.788 in 2005 and decline till 2009. It showed an increasing trend and gradually moved to 1.44 in 2014. The graph displays an overall fluctuating trend in the RCA index. This signifies that the potential for exports of steel in India is very strong over the world’s steel exports but the ratio consistently fluctuated under the study period.

The second objective of the paper is achieved by applying the RCA index. The results are based on RCA index and comparing it to the standard value. Standard value is to be taken as 1. A comparative advantage is “Revealed” if  $RCA > 1$ . If RCA is less than unity, the country is said to have a comparative disadvantage in the commodity or industry (Wikipedia RCA, n.d). During the selected study period i.e. from 2005-2014, the value of RCA remains more than one continuously. The RCA index remains between 1.788 and 1.200 ( $>1$ ). This signifies that Indian steel exports have strong comparative advantage in relation to world’s steel exports. Hence it is proved that India has a revealed comparative advantage in steel exports to the total steel exports of the world.

**Conclusion:**

It may be concluded that the comparative advantage of Indian Steel exports is ‘Revealed’ in relation to that of the world. The industry stands strongly second after China, Japan and USA in the world. Secondly, though the export potential (capacity to export) of Indian steel has strengthened but it has been fluctuating downwards due to an overall improvement in the world’s trade in total. Despite many

existing shortcomings in the industry like Fluctuating demand in global market, shortage of raw material, usage of outdated technology, labor intensive market, etc it possesses several inherent strengths that makes it competitively strong on global front, standing next to global giants like China, Japan, and USA. As the export potential of the industry is continuously developing, Government of the country needs to intensify policies to additionally endorse a more conducive environment for steel export.

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