

# An Analysis of the Impact of Imports of Steel from China on Indian Steel Industry

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## Abstract

Steel is a big indicator in a development of a nation, India has always been on the top ranks in steel production due to its rich iron ores in Orissa but today the steel industry in the world and India are in a crisis due to throat cut competition and wafer-thin margins.

Since 2008 Indian steel industries are in pressure due to falling prices in steel and very dense competition to counter this the steel companies have tried to bring their cost down to match the pricing but to do this they borrowed huge amounts of debt to expand and use economies of scale with the building of new plants in United Kingdom by Tata Steel, the opening of 3 more plants by SAIL but this has fuelled more problems than solutions.

In this paper a deep research in the current scenario of steel industry particularly India has been carried to understand the connection between the overproduction of steel in China and the impact of it on steel prices and Indian companies' profitability and debt.

In this paper through use of correlations, time series analysis and regression it is inferred that the top 6 companies in India have been fuelling a lot of debt from 2009 to 2017 which is highly correlated with the overproduction in China there seems to be a relationship between lower profits and higher debts with rising production in China, so we have recommended in this paper to come up with new solutions as to who to reduce the overproduction in China rather than imposing just anti-dumping duties on steel from China, another way the steel industry in India can flourish is by integration of various steel producers to achieve economies of scale rather than borrowing more debt to increase their production.

**Keywords:** Steel industry; Imports of steel; Analysis

## Literature Review

The world steel industry is having massive overcapacity due to a global slowdown which started in 2008 due to this steel demand has slowed in consuming regions like China, European Union, Japan, India and the US. Recent estimates for the world's surplus steel capacity have grown to 642 million tonnes, with China alone accounting for almost 50% of the global overcapacity.

This poses a potential danger if it is allowed to be dumped in the Indian market as it would result in low prices of the finished products, weak profitability leading to job losses and even bankruptcies of domestic firms.

Shanker found that the Iron and Steel is one of the oldest and most important industries in Indian economy [1]. It can safely be called the backbone of the Indian Economy for various reasons. For centuries iron had been produced in India, while as late as 1810 Indian steel was superior in quality to British steel. When India became independent in 1947 as the biggest, but not the only, successor state to the British Raj, the three-major iron and steel companies had a total capacity of only 2.5 million tons.

## Steel capacity

Xuan used a modified IPAT model to examine the influence of economy, environmental, other factors to analyse the production of steel in China and he evaluated that the production is increasing at a very high rate compared to other countries from 1990 to 2014 [2]. According to him the production of steel in China is expected to reach 901 million tons and steel stocks per capita to 8.01 tons. Technology will play a huge role other than governmental policies in this rapid increase of steel production the paper concludes the scrap to steel ratio

is to reach .366 by 2025 which will be a big boost for production of steel, the paper also talks about the increase in environmental pollution and price fluctuations, previous years due to rapid economic development in China the steel production increased rapidly but now in its slowing economy the production and demand has to be matched.

## Steel demand in China

Due to rise in economic development, the Chinese steel industry has expanded at an abnormal growth over these decades [3]. But, due to this expansion has resulted in many problems, such as increasing energy consumption and excessive environmental pollution. Therefore, it is important to analyse the future steel demand in China. This study presents changes in steel production and apparent steel consumption in the years 1998-2010. Steel is mainly consumed by construction, machinery, automobiles, shipbuilding, railways, petroleum, household appliances and containers, and these nine industries are analysed separately using stock-based models. The study suggests steel demand in China will rise from 600 million t in 2010 to a peak of 753 million t in 2025, and then gradually decrease to 510 million t in 2050. The construction industry is the largest steel consumer, although its share of total steel demand will decrease in the future. Steel demand in automobile manufacturing, by contrast, will increase rapidly before

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2035, and its share will increase from 6.0% in 2010 to 19.0% in 2050. Sensitivity analysis on the four major impact factors such as saturation levels, lifetime distributions, GDP and urbanization rate shows that saturation levels of different products greatly affect long-term and short-term steel demands, while GDP and lifetime distributions, especially the lifetime distribution of buildings, mainly affect the short-term and long-term steel demands, respectively.

China's steel production reached 500 million metric tons in 2008 [4]. The growth of the steel sector has benefited from the rapid economic development and strong domestic demand. However, it is facing two challenges: overcapacity and production fragmentation. First, for long-term sustainable development, domestic steel enterprises will have to put a cap on their production output. Second, China's steel industry is perhaps the most fragmented in the world. The lack of production consolidation results in duplicated development and cut-throat competition among domestic steel enterprises. Most of these steel firms suffer from weak competitiveness and low production output. The steel industry is big, but not strong. Mergers and acquisitions (M&A) are the key strategy for the development of China's steel industry.

This paper analyses the excess capacity degree of Chinese iron and steel industry from 1996-2012 through the composite index method and grey system theory and warns the excess capacity degree of iron and steel industry the next three years [5]. What's more, this paper put forward different operability suggestions from government, association and enterprises perspective. The research shows that Chinese iron and steel industry will be in excess capacity in recent years, which will even get worse with the change of domestic and international economic environment. So, it is necessary for resolving the contradiction of excess capacity.

### Profitability and competition

In view of the reality that low industrial concentration has become the explicit problem that constrains China's iron and steel industry [6], this article explores the relationship between industrial concentration and profitability and conducts an empirical analysis on this relationship for China's iron and steel industry with VAR model. The results show a long-term steady equilibrium between industrial concentration and profitability for China's iron and steel industry with differences in short-and-long-term causal relationships and the mutual impact of the extent and direction between industrial concentration and profitability in different sub-industries. Thus, China should adopt measures to improve iron and steel industry concentration.

Data envelopment analysis (DEA) has been employed to calculate the relative efficiency of the steel manufacturing units, the result of the efficiency scores have been categorized into three parts [7]. The pure technical efficiency represents local efficiency and the reason of inefficiency is due to inefficient operations. Technical efficiency indicates that the respective decision-making units are globally efficient in case the efficiency is 100 per cent. The SE explains that the inefficiency is caused by disadvantageous conditions. As the result shows, that public sector undertaking (PSUs) are operating under disadvantageous conditions as compared to private manufacturing units. One of the possible reasons of location disadvantage condition is manufacturing units for PSUs are scattered throughout India. Some of the units are located in such places where, the raw material, supply chain could be difficult. It has been found that 45 per cent of the private manufacturing units are technically as well as scale inefficient units.

We quantify the impact of the European Emission Trading Scheme (ETS) on the two dimensions of competitiveness – production and

profitability – for the iron and steel industry [8]. Among those covered by the scheme, this sector is one of the most exposed, since it is both highly CO<sub>2</sub>-intensive and relatively open to international trade. We also examine the robustness of these results to various assumptions: marginal abatement cost curve, trade and demand elasticities, as well as pass-through rates and updating of allocation rules, of which the latter two are scarcely debated.

We conclude that for this sector, competitiveness losses are small. We prove this conclusion to be robust. Hence arguments against tightening the environmental stringency of the ETS in Phase II are not justified on grounds of competitiveness loss. Our systematic sensitivity analysis allows us to identify the important assumptions for each output variable. It turns out that pass-through rates and updating rules are significant, despite being often implicit and least debated in existing analyses.

### Research Methodology

The research carried out will through a deep analysis of the various steel reports in steel industry from 2008-2017 and various intellectual papers on the steel industry specifically the Chinese and Indian steel industry [9].

As seen in the literature review that the steel prices are dipping down and there is huge surplus in china a correlation would be necessary to analyse the dependency between them.

As many steel companies are facing problems with their profitability namely ESSAR steel, SAIL and electro steel an analysis of their revenue and profits is necessary.

To find the relationship between the surplus steel production and Indian profitability a correlation of the them is necessary.

Further a time series analyses of debt of various steel industry is very important as it has been a great worry as various banks are marking steel companies' debt as NPA and risky, we will see if debt is increasing and if it is increasing is it at a higher pace than revenue and profits [10].

Also, the correlation between debt of various steel companies and the surplus of steel production is necessary also with price of steel as they will reflect how can companies reduce their debt.

Data collection will be on a number of variables namely:

1. Production of steel
2. Steel demand
3. Pricing of steel imports
4. Steel production surplus in china
5. Profits of top 5 steel companies in India
6. Revenues of top 5 steel companies in India
7. Debt of top 5 steel companies.

Objectives of the report:

1. To analyse the trend of imports of steel from china across the globe.
2. To analyse the pricing of finished product vs raw materials in steel industry.
3. To analyse the production surplus trends in the Chinese economy and steps taken to reduce it.

- To understand the impact on sales and profitability of Indian steel industry due to increasing imports from china.

Null Hypothesis: The increasing imports of steel from the Chinese economy is affecting the revenues, profits and debt of Indian steel industry.

Alternative Hypothesis: The increasing import of steel from Chinese economy is not affecting the revenues, profitability and debt in Indian steel industry.

Error of confidence: 95%.

Tests to be used in analysis of the data:

- Pearson’s correlation- correlation would be done on the production and various financial indicators of the steel industry.
- Time series analysis- to understand the trend in various variables.
- Descriptive analysis- various descriptive statistics like mean, mode, variation, etc. on select variables.

### Data Analysis

Surplus in production of steel versus demand there is a big surplus in the demand vs production in world steel industry in terms of raw number and according to calculations this capacity is increasing rather than decreasing the surplus is decreasing in china as it is implementing lower capacity policies but the overall production in china is increasing a high rate and many says that the data provided by Chinese officials are wrong and that the overcapacity may be much more than said due to rapid increase in surplus in world and china being a 50% contributor to the world production (Table 1) [11].

According to the above table:

- China’s demand has been picking up at a high pace, while production is increasing at a much higher pace due to state policies.
- Overcapacity in china is reduced due to some policies implemented in 2016-2017 due to pressure from various countries but is still is big problem in terms of raw numbers.
- Overcapacity in world has been increasing due to reduced demand in Europe, USA, Africa and even china.

In the below charts we can say that:

The production of steel has been more than demand since 2009 after the recession of 2008 many experts are trying to find the root cause of this surplus in steel industry which is increasing rather than decreasing (Figure 1 and Table 2).

From the above table we can see that:

- Increase in china’s demand is highly correlated with world demand.
- Increase in production in china is correlated with production world but not that much to the demand.
- World production is highly correlated with Chinese demand in steel.
- World demand is correlated with Chinese steel production.

### Steel prices

Steel prices are a big factor in considering the margins for the steel industry after 2008 there was dip in steel prices, but they soon raised after 2011 to fall again in 2015-2017 and now are rising at a low pace [12].

	Year	China domestic demand	China steel production	Indian steel production	World production	Overcapacity in china	Overcapacity in world
Pearson Correlation	2016-2017	0.732	0.844	0.270	0.856	-0.176	0.315
Sig. (2-tailed)		0.000	0.004	0.083	0.003	0.263	0.006
N		9	9	9	9	9	9

Table 1: Production of steel vs. demand.

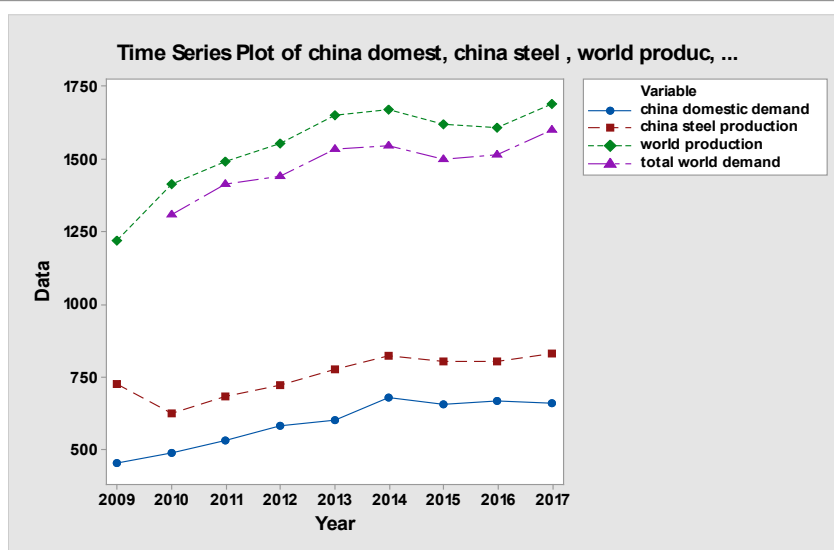


Figure 1: Time series plot of China from 2009.

Steel prices are highly different from one county to other but in steel monitor report of 2017 the mean steel prices were calculated from various countries and compiled from which the data is picked up (Figures 2 and 3, Tables 3 and 4).

**Analysis**

- 1) In this we can see a down trend in overall prices which is predicted to fall further though there is sight increase in it 2017 that seems to be correction rather than a trend.
- 2) We can see that in Table 5 that steel prices are negatively correlated with
  - World production (weakly)
  - Chinese steel production
  - Overcapacity in china (high)
  - Overcapacity in world (medium)
- 3) We can see that in Table 5 that steel prices are positively correlated with
  - Indian steel production (very weak)
  - Chinese domestic demand (strong)

- 4) It is seen that the steel prices are highly negatively correlated with Chinese overproduction which means there is a high possibility if the overcapacity decreases then only the steel prices may increase china domestic demand china steel production Indian steel production world production overcapacity in china overcapacity in world.

**Conclusion and Recommendations**

In the above study it is been seen that the overproduction in china is affecting most of the companies in India due to its heavy export of any surplus it produces, China producing more than half of the world steel form 15% in 2003 has grown mostly because of selling steel at a lower price as it is seen in the regression table that the overproduction in china is heavy indicator of steel prices of exports from china.

To increase steel prices the government of India is trying to put anti-dumping duties on Chinese steel but the problem with that is that china does exports to India are very low as India does not need that much imported steel as countries as much U.S.A and European countries, which are the major customers of many steel companies in India there is a big surplus in the demand vs production in world steel industry in terms of raw number and according to calculations this capacity is increasing rather than decreasing the surplus is decreasing

		Total world demand	World production	China steel production	China domestic demand
Total world demand	Pearson Correlation			0.835	
	Sig. (2-tailed)			0.005	
	N			9	
World production	Pearson Correlation				0.922
	Sig. (2-tailed)				0.000
	N				9
China steel production	Pearson Correlation		0.691		
	Sig. (2-tailed)		0.039		
	N		9		
China domestic demand	Pearson Correlation	0.935			
	Sig. (2-tailed)	0.000			
	N	9			

Table 2: Correlations.

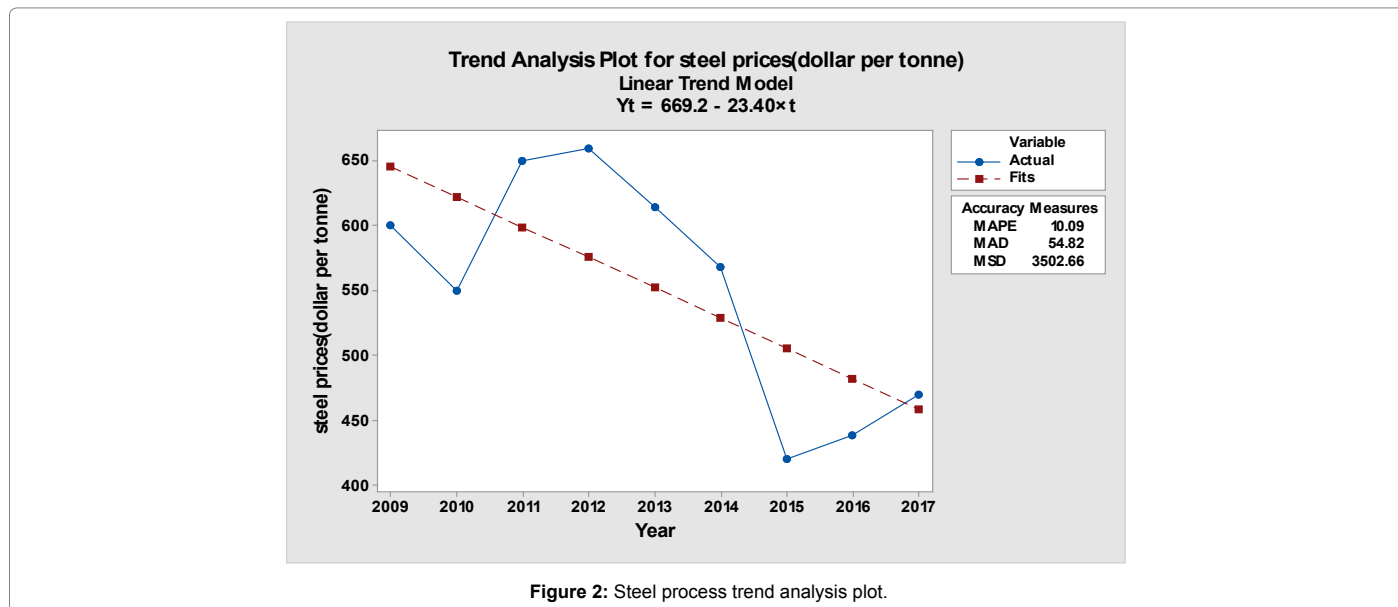


Figure 2: Steel process trend analysis plot.

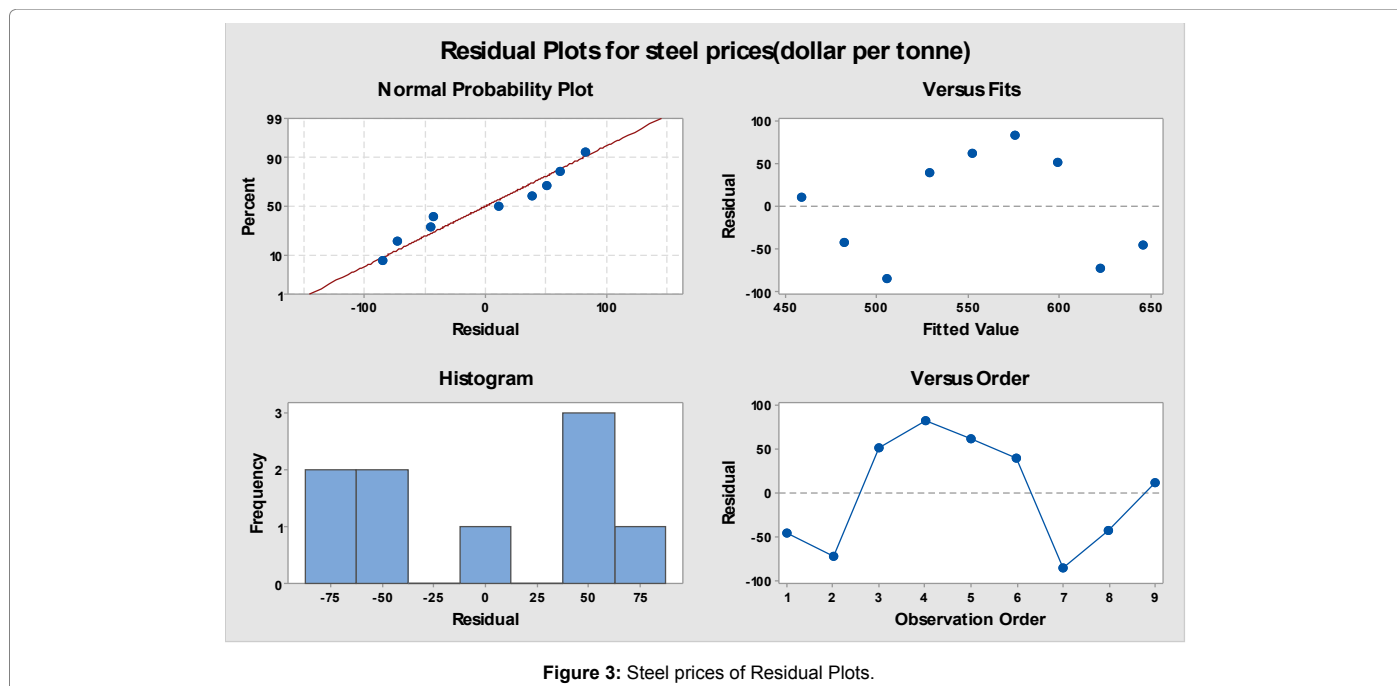


Figure 3: Steel prices of Residual Plots.

Model	R	R Square	Std. Error of the Estimate
1	0.8783865 <sup>a</sup>	0.772	2.10141

<sup>a</sup>Predictors: (Constant), overcapacity in china

Table 3: Model summary.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2392.031	1	2392.031	25.27	.019 <sup>b</sup>
	Residual	11985.525	7	4784.062		
	Total	14377.556	8			

<sup>a</sup>Dependent Variable: steel prices (dollar per tonne).

<sup>b</sup>Predictors: (Constant), overcapacity in china.

Table 4: ANOVA<sup>a</sup>

		China domestic demand	China steel production	Indian steel production	World production	Overcapacity in china	Overcapacity in world
Steel prices (dollar per tonne)	Pearson Correlation	0.560	-0.119	0.049	-0.371	-0.835	-0.509
	Sig. (2-tailed)	0.117	0.131	0.039	0.326	0.008	0.009
	N	9	9	9	9	9	9

Table 5: Correlation of steel prices in India and China.

in china as it is implementing lower capacity policies but the overall production in china is increasing a high rate and many says that the data provided by Chinese officials are wrong and that the overcapacity may be much more than said due to rapid increase in surplus in world and china being a 50% contributor to the world production (Figure 4 and Table 6).

we can see that revenue has not been affected of the companies over the years except for SAIL the government owned company this could mean many things that the revenue increases with decrease in steel prices or it could mean that steel companies are expanding at a high rate and the market is growing.

Growth in revenue does not mean the company health is good as the essar and electro steel revenues did increase at a very high rate but they still were declared non-performing asset the company's revenue is

negatively correlated with steel prices which means as the steel prices decrease the revenues has been increasing at a significant rate (Table 7).

We can see that profits has slipped for many companies over the years and for some like jsw, essar and electro steel the profits increased, the electro steel profits rose only after 2015 before which it was very low and it was declared an NPA, which seems that profit have dipped even though revenue has increased which is a big problem as companies need profits for future growth and fighting effects of recession times.

SAIL is one of the most effected in terms of profit with its profit dipping to negative values and the correlation between overproduction is small but significant, so it could mean a recovery of SAIL can made if the overproduction decreases (Figures 5 and 6, Table 8).

The major effect has been debt in terms of downturn for a company tata steel has been careful with this and is reducing its debt to match the

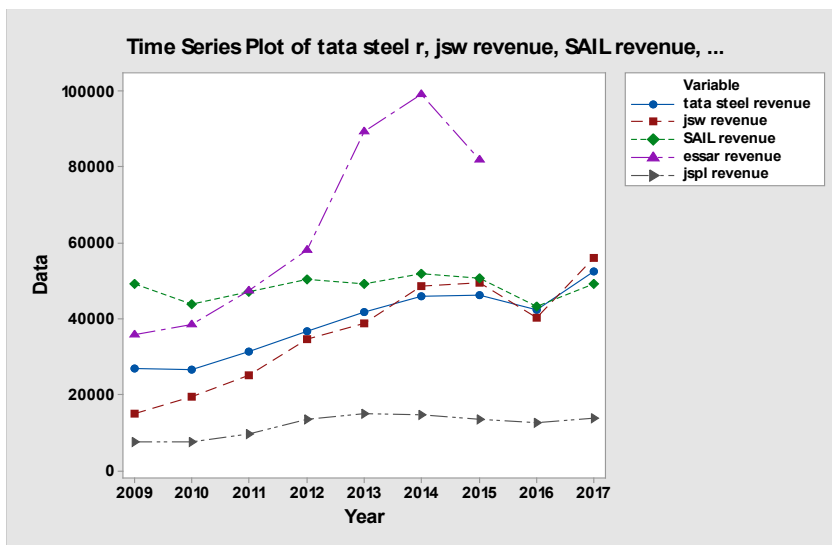


Figure 4: Tata steel revenue.

	Tata steel revenue	jsw revenue	essar revenue	Electro steel revenue	jspl revenue	SAIL revenue
Year	0.944	0.934	0.906	0.879	0.767	0.095
Overproduction (china)	-0.320	-0.405	-0.356	-	-	-0.237

Table 6: Revenue of the companies over the years.

	Tata steel profits	jsw profits	essar profits	Electro steel profit	jspl profit	SAIL profits
Year	-0.282	0.455	0.820	0.595	-0.819	-0.934
Overproduction (china)	-0.273	-	-	-	-	-0.304

Table 7: Profits of the companies over the years.

	Tata steel debt (in cr.)	jsw debt	SAIL debt	essar debt	Electro steel debt	jspl debt
Year	-0.343	0.940	0.882	0.956	0.918	0.956
Overproduction (China)	0.606	-0.295	0.557	0.771	0.573	0.408

Table 8: Debts of the companies over the years.

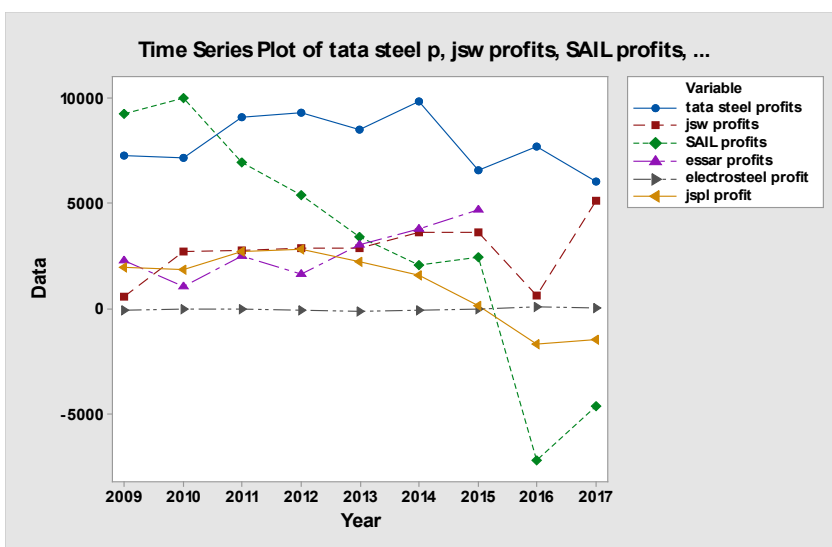


Figure 5: Tata steel profits.



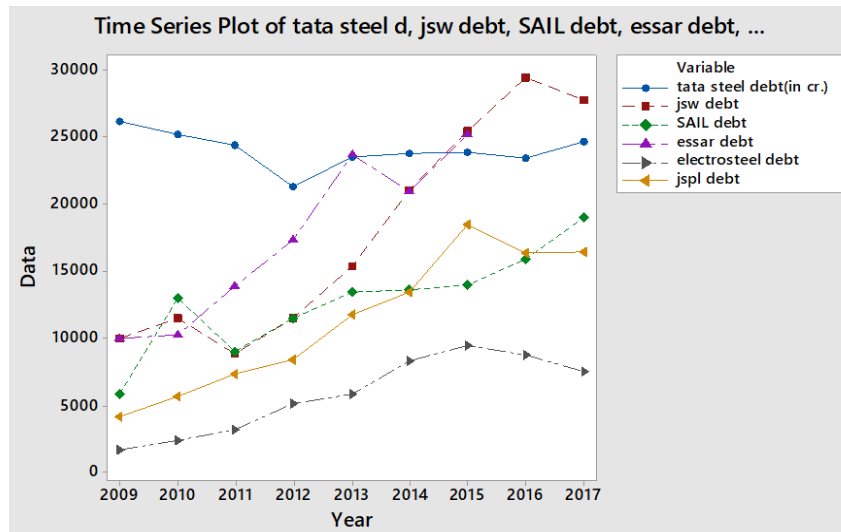


Figure 6: Tata steel debt.

ongoing recession in steel industry but many like electro steel and essar had taken so much debt without considering the state of steel economy and were declared NPAs.

Due to this high debt many companies face problems it was declared by RBI that steel industries in India are at a crisis in repaying their loans and the banks should be careful when giving loans to them many companies borrow loans to cover their before debts so that just the operations could continue and when in boom period they could pay the loans but as we can see the surplus in economy is not to be decreased in the near future so companies must ensure to reduce their debt.

The major finding in this paper is that the debt has a big factor to play when considering a health of the company and it is very much correlated significantly with overproduction in china so to reduce the debt one possibility would be to reduce the overproduction china by use of means such as political pressure by combing with EU,UK and the USA in trying to reduce the production fuelled by Chinese government then only can the Indian companies have a fair chance of survival or another way is to join forces and use economies of scale to match the prices which many companies like Jindal steel is doing by buying essar steel.

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