Analysis and Forecast of U.S. Steel Scrap Price Trends Based on the Linear Model

WANG Minxi¹,², GU Shanlu² and LI Xin²

1 School of Business and Administration, Sichuan University, Chengdu 610064, China
2 College of Management Science, Chengdu University of Technology, Chengdu 610051, China

1 Introduction

Steel scrap is generated within steel mills and foundries or industrial plants. It can be used for fabricating new iron and steel products. The iron ore and scrap steel are two main raw materials to produce steel. But scrap steel in crude steel production can greatly reduce the exploitation of iron ore and energy consumption. Scrap steel has become an important alternative source of iron ore. So it’s important for analysis and forecasting the scrap steel price. In a free market economy, scrap prices react quickly to changes in supply and demand. Scrap prices seem to be more sensitive to demand changes. When demand for steel mill and foundry products is low, demand for scrap is low, and prices fall. Scrap metal prices quoted in major trade publications, such as American Metal Market, have been considered by many economists to be an excellent barometer of current industrial demand (Fenton, 2010). In this paper, we use Linear model to analyze and forecast the scrap steel price in US.

2 Model, Data and Analysis

2.1 Model

In this paper, we use linear model to analyze data, and then operate by MATLAB. The purpose is to fit the trend curve function by analyzing history data and predict the future price for scrap steel in US.

Linear model: 
\[ f(x) = p_1x^4 + p_2x^3 + p_3x^2 + p_4x + p_5 \]
Fitted model: 
\[ f(x) = -0.01812x^4 + 145x^3 - (4.352e+005)x^2 + (5.804e+008)x - 2.903e+011 \]

2.2 Data

* Corresponding author. E-mail: sallywang68@163.com

In this paper, we collect the data of US scrap steel price in American Metal Market from 1990 to 2010. They are used to analyze scrap steel price and trends in US.

2.3 Analysis

The results are showed in Fig. 1, x stands for time (year), y stands for the price of scrap steel (values in dollars per metric ton). The US scrap steel price is in line of “S” shape. This is consistent with the trend of global scrap steel price. The US scrap steel price is expected to increase in the future.

![Fig. 1. The line chart of scrap steel price in US and the fitted line.](image_url)

According to the Annual average U.S. steel scrap price, it indicates that: From 1990 to 2010, US scrap steel price increased about 200%. By 1990, U.S. exports and imports of ferrous scrap to feed minimills built in the United States and abroad reached record highs. Ferrous scrap prices declined significantly during 1991 as domestic and world demand for scrap decreased. Domestic demand began to increase during 1992, and world demand remained weak. The period from 1993 to the first half of 1997 was one of strengthening demand for ferrous scrap and rising prices.
Developing countries in Asia etc., experienced significant economic growth. Minimill capacity increased worldwide, and integrated steel mills increased efficiency and scrap usage. The Asian financial crisis of 1997 continued to have an adverse financial effect on steel industries throughout the world until early 1999. From 1997 to 2001, prices for steel products and ferrous scrap declined steadily to record lows. Ferrous scrap prices generally increased from late 2001 to an historic high in 2008, resulting from economic growth in the United States and developing countries, especially China. The U.S. and global economic crises eventually brought about a global decline in steel demand in late 2008. World apparent steel consumption declined as did steel production and demand for scrap and scrap substitutes. Scrap prices decreased significantly from late 2008 through 2009, and then rebounded to nearly 2008 highs in early 2011.

3 Conclusion

Based on the above analysis, the price of US scrap steel increased about 200% during the latest 20 years. As the world economy begin to recover, steel consumption and production will be increased, and demand for scrap steel will be increased. The price of scrap steel will be increased too. There is a strong correlation between scrap prices and the economic development.

Acknowledgments

We thank the United States Metal Market for their data and information. We also thank all anonymous reviewers for their constructive comments and suggestions.

References

Michael D. Fenton, 2010. *Iron and Steel Scrap (Fe)*. Metal Prices in the United States Through. 73–75.