

A Dynamic Model of U.S. Scrap Steel Prices

by

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In the last three decades of the 20th Century, the price and availability of ferrous scrap, perhaps more than any other factors, helped to determine the competitive dynamics of competition among steel makers in North America. The restructuring that occurred in the United States steel industry in the 1980s and the 1990s is explained in large part as contest between two alternative technologies for making steel, one based on the conversion of iron ore and the other based on the recycling of ferrous scrap. The closure of ore-based mills in the 1980's eliminated a great deal of unused steelmaking capacity in the North America, but it also heralded the exit of ore-based manufacturers from product lines that were in direct competition with scrap-based manufacturers. Today, over 60 percent of the raw steel produced in the United States is made in Electric Arc Furnaces (EAFs) that recycle ferrous scrap, with ore-based integrated producers accounting for the rest. As recently as 1994, the tables were reversed: Ore-based producers accounted for more than 60 percent of US raw steel production, while recycling accounted for less than 40 percent.

Even this dramatic trend in ore-based versus scrap based steel production understates the importance of ferrous scrap as competitive factor in the steel industry. Beginning in 2002-2003, ferrous scrap prices began to track dramatically upward in international markets along with the prices of many other basic commodities. The resulting cost pressures affected steel firms across the board, for even ore-based steel manufactures require substantial amounts of ferrous scrap when they convert pig iron to raw steel. Wild swings in scrap prices also became characteristic of the market during recent years, and this has led to the wide-spread adoption of pricing policies that index the price of steel to the cost of raw materials. Today, steel manufacturers and steel fabricators worldwide are keenly focused on ferrous scrap markets, knowing that their profitability hangs in the balance of related price movements.

Our efforts to model the behavior of monthly prices in this market bring new techniques to bear on one of the most challenging forecasting problems confronted by steel makers world-wide.