



Bankruptcy and steel plant shutdowns

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ABSTRACT

The bankruptcies resulting from the American steel industry downturn in the period, 1999–2002, raise the question of whether the bankruptcy process itself led to permanent plant shutdowns and job losses. With information on 110 of the steel plants operating in the United States in 1994, this paper develops empirical models of steel plant closure and firm bankruptcy to see if the latter impacts on the former. Based on survival models, the results provide support for the hypothesis that the bankruptcy of steel companies could have led to viable steel plants closing, and thus, the bankruptcies in themselves may have caused permanent inefficient employment loss.

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1. Introduction

The recession of 2008 through 2010 led to financial distress and even bankruptcy for many large companies. These bankruptcies may have resulted in the large permanent layoffs. The prospect of these layoffs led to the demand for governments bailouts. In these situations, the governments would either pay off the firm's creditors or force them to forego or delay the collection of their debt.

Other than the economic inefficiency of the firm there are two major reasons that bankruptcy itself can cause lay-offs. The first is that for some products the threat of bankruptcy can lead buyers to cease patronizing a firm even when it is still in operation. This is called the "orphan effect." A second reason for bankrupt firms shutting down viable plants arises from the financial structure of the firm. Economic and financial experts, however, are divided on this issue. Some posit that the interaction of the financial structure of the firm and the process of bankruptcy can lead to the shutdown of viable plants (Bolton & Scharfstein, 1996; Gertner & Scharfstein, 1991; Schleifer & Vishny, 1992). In certain circumstances, theoretical analysis confirms this assertion. Others, however, maintain that bankrupt firms can efficiently dispose of viable assets (Haugen & Senbet, 1978). They argue that firms often lose money on projects that have little to do with most of their operating plants. If a firm with a viable plant enters bankruptcy, either a new reorganized firm can take the plant over or it can be sold to another firm.

Empirical support can be found for either of these theories (Andrade & Kaplan, 1998; Maksimovic & Phillips, 1998; Opler & Titman, 1994; Pulvino, 1998).

A case study can do much to illuminate this issue. The steel industry in the period between 1994 and 2006 provides such an example. Certain industry characteristics, however, may be relevant to the analysis. First, as will be shown, steel is a producer good, and steel customers are knowledgeable people who can readily ascertain the product quality of a given firm. Thus, if one firm leaves the market due to bankruptcy, another can readily replace it as far as the buyer is concerned. When a plant changes owners, customers will continue patronizing it if it produces the desired product. Consequently, if it is found that bankruptcy leads to efficient plants closing, then, this would provide strong evidence for the influence of the financial structure on the operation of efficient plants.

Additionally, steel has always faced a cyclical demand situation. This puts firms in positions where they have to dispose of their assets to avoid or emerge from bankruptcy. In the mid and late 1990s, the pattern repeated itself. Domestic steel sales dropped, and problems in Southeast Asia increased imports into the United States. In the subsequent downturn, twenty-four American steel companies underwent bankruptcy. Among them were the large integrated companies and even minimill firms with the latest technology. During this steel slump, steel firms were not able to persuade the government to bail them out in the way the automobile and banking firms did in 2008 and 2009.

The demise of these firms raises the question of whether the bankruptcy process led to plants shutting down and their consequent job losses. With information on 110 steel plants operating in the United States in 1994, this paper examines the influence of

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these bankruptcies on the survival of given steel plants. To accomplish this goal, we set up empirical models to test the connection between steel plant closure and firm bankruptcy.

Before examining these models, the steel industry in the late 20th century is described. Then, we review the relevant literature on the question. Third, we present the models used to test our hypotheses. After that, we discuss the sample and the variables used in the analysis. Then, the empirical results are given. Last, some conclusions are drawn.

2. The steel industry

To understand the relevance of steel to the bankruptcy issue, two aspects of the industry should be examined: technology and demand. In the late 20th century the industry underwent three major technological changes. The first change was the replacement of the open hearth, the old standard steel furnace for integrated mills, with the Basic Oxygen Furnace (BOF). This was a slow process beginning with the first BOF installation in 1954 and ending in 1991 with the last open hearth closing down (Lynn, 1982; Rogers, 2009). Second, the primary rolling mills which shaped the intermediate steel pieces, slabs, blooms, and billets, were replaced by the continuous caster. Third and most important, the electric furnace which usually employs scrap has become the dominant technology for making steel (Barnett & Crandall, 1986; Preston, 1992). By 2000, plants with this type of furnace (often called minimills) accounted for 55 percent of the steel produced. Costing millions of dollars, these changes resulted in plants being obsolete before the end of their apparently useful life. Thus, by the 1990s, different companies and plants were operating at quite different levels of efficiency.

Additionally, the industry experienced a drastic fallback in demand in the 1970s and 1980s. Production dropped from 150 million tons in 1973 to 98 million in 1989. Many reasons have been given for this decline; among them backward technology, competition from imports and substitutes. The literature detailing this situation includes the following: Barnett and Crandall (1986), Barnett and Schorsch (1983), Crandall (1981), Duke et al. (1977), Hogan (1983, 1986, 1994), Preston (1992), Rogers (2009), and Tornell (1997).

This fallback and the dislocations caused by the technological changes led to extremely difficult times for steel firms and steel workers. In the 1970s and 1980s, a number of steel firms underwent bankruptcy. Among them were Wheeling-Pittsburgh, and Sharon Steel. In the late 1970s, LTV acquired Youngstown Sheet & Tube which was on the verge of bankruptcy, and LTV acquired Republic Steel also on the verge of bankruptcy in 1984. In 1985, LTV underwent bankruptcy.

To alleviate the steel industry problems, the federal government undertook a number of policies to attenuate imports. Among them were quotas on the import of steel from given countries and a pricing scheme called Trigger Price Mechanism (TPM) that was thought to keep the price of imports consistent with most American firm costs. Throughout the period, steel firms brought dumping cases against foreign companies that may have been charging prices below average costs. Sometimes, these actions were legally successful, but as a whole these cases and the quota and price policies did little to slow the decline of the steel industry (Mueller, 1984).

In the 1990s, the steel industry stabilized, and its profitability revived. Between 1990 and 2000, production rose from 99 million tons to 112 million tons. As a whole, the industry experienced seven years of profitability between 1993 and 1999. In the late 1990s, however, the cyclical pattern of the industry reasserted itself. Domestic steel sales dropped, and problems in Southeast

Asia increased imports into the United States (Rogers, 2009, pp. 161–190). Production fell from 112 million tons in 2000 to 99 million tons in 2002. As a result of this downturn, a number of steel companies underwent bankruptcy. Among them were several traditional fully integrated BOF firms: for example Bethlehem Steel, LTV Steel, National Steel, Gulf States Steel, and Wheeling-Pittsburgh. Some like LTV and Wheeling-Pittsburgh had been in bankruptcy before, but others like Bethlehem had never experienced such distress in the 20th century. Bankruptcy spread to even minimill firms with the latest technology such as Bayou Steel, Birmingham Steel, and Georgetown Steel.

In reaction to these troubles, some companies brought more dumping cases, but the major response came from President George W. Bush. For a wide set of steel products, he brought a special type of tariff action called a Section 201 case. This action set up a quota system for given steel products, imposing substantial duties on imports above those quotas. During the whole of this slump, however, the steel firms were unable to persuade the government to bail them out of their bankruptcies. This contrasts with the experience of the automobile and banking firms in 2008 and 2009.

Bush's quota system was originally intended to last three years, from 2002 to 2005, but steel demand increased, and pressure from steel buyers led Bush to end the quotas in 2004. As of 2006, a large number of the mills that were closed temporarily were open. In the analysis below, we assume that if a plant was operating in that year, it was economically viable.

Some statistics on the steel industry can help one understand the issues. Table 1 which defines the variables used in the analysis gives some idea of the structure of the industry. As of 1994, there were 110 steel plants in the sample (plant being defined as an establishment with a steel furnace which transforms raw iron or scrap metal into steel). Of these 110 plants, 22 were integrated Basic Oxygen plants where iron smeltered in on-premise blast furnaces is transformed into steel, and the others were plants with electric furnaces. The latter usually relied on scrap steel as an input. Most of the mills were concentrated in the traditional steel making region consisting of Pennsylvania and the eastern part of the Midwest. Just over one quarter of the mills (26.4 percent), however, were located in the southern part of the United States. With two exceptions, the southern mills were all electric furnace plants.

The sample steel mills were owned by 73 companies. The bulk of them (50) were steel specialists. Some of these firms were focused mainly on other products: examples being Timken and Worthington. Some like Nucor and LTV started in other products but became mainly focused on steel. Fifteen of the firms are multiplant firm; Nucor being the one with the largest number of plants (eight). In 1994, foreign companies were operating as joint ventures with American companies such as U.S. Steel and Nucor. Furthermore, AK and National Steel were companies jointly owned by American and Japanese firms. The bankruptcy episode under discussion changed this situation; today large foreign companies such as ArcelorMittal, Severstal, and Gerdau are major factors in the American steel industry.

Of the 73 companies having steel plants according to the source, 24 underwent bankruptcy. Of special importance to the hypotheses on governance was the ownership structures of these firms, 54 of the firms were listed on exchanges or the NASDAQ. Of the 24 firms that underwent bankruptcy, 20 were widely held companies traded on exchanges. Thus, for these firms, a potential exists for governance problems that can lead to bankruptcy shutting down efficient plants.

Thus, all these situations raise the question of whether bankruptcy leads to efficient plants permanently closing down.

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