

# Steel: Challenges, Opportunities, and Change



Steel remains one of the most important manufacturing industries in Indiana, and the dominant manufacturing industry in Northwest Indiana. The Chicago region continues to lead the U.S. in steel production, accounting for as much as 28% of the total output of steel in the country.<sup>1</sup> Currently, steel mill employment accounts for nearly 10% of total employment in Northwest Indiana,<sup>2</sup> compared with 0.3% of total U.S. employment.<sup>3</sup> However, the importance of the steel industry locally and nationally as a source of employment has declined both locally and nationally. In addition, a more complex domestic industry and more aggressive international competition have made the performance of the steel industry, particularly in Northwest Indiana, more volatile, and its future more difficult to project.

In this report, we discuss four aspects of the steel industry that are important for understanding both its past and its future. In the first section, we examine changes in the structure of the domestic steel industry, in particular the emergence of mini-mills and their impact on integrated producers. Next, we turn to an examination of long-term industry output and productivity trends. Finally, we consider some short-term issues involving international competition and domestic labor relations.

## Industry Structure

Six years ago, one of the authors of this report (with two co-authors) published an analysis of the integrated steel industry, with particular reference to Northwest Indiana, which suggested that integrated steel-making firms were in serious difficulty, facing possible extinction (with the possible survival of finishing mills) as a consequence of the rise of mini-mills.<sup>4</sup> Indeed, current data from the Iron and Steel Institute suggest that mini-mill output has approached half of total industry output<sup>5</sup> in the U.S.

Not all of the predictions of decay, decline, or collapse of integrated steel have come true. Partly, the relatively good news has come from integrated steel having worked and continuing to work very hard on its survival. The long-term results are as yet uncertain, and integrated steel currently faces continued competitive threats from mini-mills and from foreign competition.

Until the rise of mini-mills, economists tended to classify the steel industry as a classic "oligopoly" industry. An oligopoly industry is characterized by a small number of competitors, generally from 2 to 10 firms, with substantial barriers to entry of new competition. These barriers occur primarily because of what is known as "economies of scale." Economies of scale exist through the sheer size of the firm and its ability to produce at very low costs of production. Others lack the financial ability to build a firm large enough to compete

with these industrial giants. Names such as United States Steel and Bethlehem Steel were commonly used to illustrate real-world examples of oligopoly firms.

The advent of mini-mills changed the conventional wisdom regarding the steel industry as an oligopoly. Relatively small firms whose investment and capital requirements were significantly smaller than big steel challenged integrated steel. The "Dinosaurs" article mentioned above forecast the demise of formerly oligopolistic large firms in favor of smaller mini-technology firms. It is important to note that the rise of the mini-mills was, in fact, a response to new technologies that allowed for smaller producers to compete cost-effectively. These technological changes in some ways have reversed a centuries-long trend of changes that have favored large-scale enterprise at the expense of smaller firms. It was, in part, the unexpected nature and implications of the new technologies that made adjustments by integrated producers difficult.<sup>6</sup> To survive, the integrated producers faced changing how they did business.

The rise of the mini-mills was...a response to new technologies

Today the evidence is not so clear that mini-mills will drive integrated producers out of the steel industry; there appear to be "niches" for both large and small producers in steel. It appears that economies of scale do exist for integrated steel in some areas, primarily at the finishing end. Some mini-mills, such as Nucor, have achieved a size that qualifies them as "big" producers and the question arises about where they should be placed in the order of things. It is no longer a certainty that a mini-mill will necessarily survive if not properly managed. A case in point is Qualitech Steel, an Indiana mini-mill that filed for bankruptcy protection in March 1999.

In spite of a number of local and state incentives, Qualitech did not succeed. According to an article by Bill Koenig in the *Indianapolis Star* (May 1, 1999), "Qualitech had wanted to get production up to 40,000 tons a month. The best the Pittsboro plant did was in March, when it hit 10,000 tons. The factory needed 21,000 tons a month just to break even."

**Gary A. Lynch**

*Professor of Economics  
Division of Business and  
Economics  
Indiana University Northwest*

**Donald A. Coffin**

*Associate Professor  
of Economics  
Division of Business and  
Economics  
Indiana University Northwest*

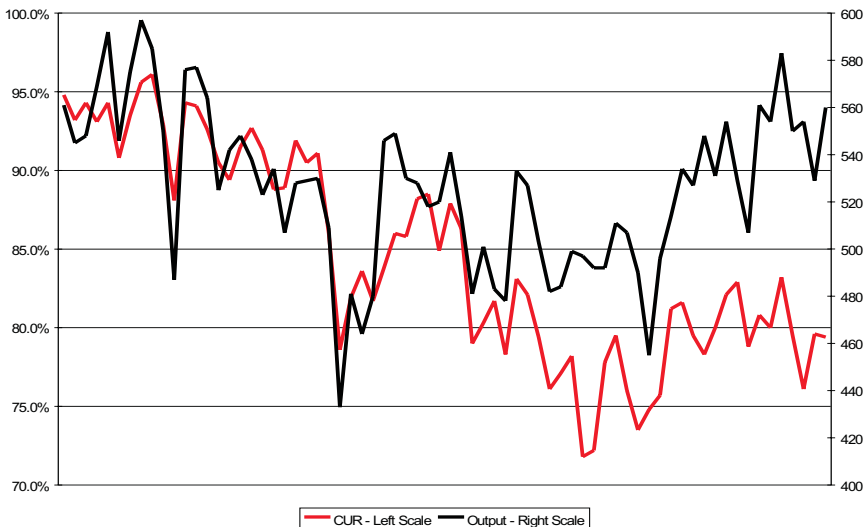
As the case of Qualitech indicates, mini-mills have also faced the necessity to adapt to an accelerated rate of change.

The survival of any business is based on a Darwinian survival of the fittest. Those firms who are most successful in producing a quality competitive product at low price and low costs will survive, while others will not. The survival of domestic steel, both integrated and mini-mill, depends on its ability to respond to competitive pressures, most pronounced at present from foreign sources. It is no longer the case that the survival of a domestic mini-mill is a "given" simply due to an advanced technology. The management of that technology is equally as important as the technology itself. What is clear is that a return to dominance of the domestic steel industry by a small number of extremely large integrated producers will not happen. The structure of the industry appears to have changed, permanently, and in the direction of increased domestic competition. For users of steel, this can only be a benefit.

**Output and Productivity Growth**

The change in the structure of the steel industry toward increased domestic competition has had implications for the performance of firms in the industry and, by extension, for workers in the industry. The increased competitive pressures in steel have placed a large premium on continued innovation in process and organization. These innovations will be accompanied by rising productivity in the industry. A second implication is a growing need to control costs. Since steel-making firms are, if anything, less likely to be vertically-integrated than in the past, this means controlling the direct costs of the steel-making process. One arena in which this can be done is to control labor costs.

**Figure 1**  
**U.S. Weekly Steel Output and Capacity Utilization Rates (CUR), 1998-1999**



Productivity in the steel industry has increased at a dramatic rate. The Iron and Steel Institute estimates that worldwide steel output has increased by about 30% over the past 25 years, while employment has dropped by half.<sup>7</sup> These numbers suggest an increase in productivity-output per worker-of about 4.06% per year for the past quarter century. By contrast, overall productivity growth in the U.S. economy has averaged only about 1.1% per year in the non-farm business sector and about 2.8% per year in manufacturing.<sup>8</sup> However, steel output grew at a rate of only 1.05% per year. The consequence is clear: employment has to fall in the steel industry. If these output and productivity trends continue, worldwide steel employment will fall at an annual rate of about 3% per year for the foreseeable future.

But the rapidly rising productivity is, for the U.S. economy and for the world economy, an almost unalloyed good. It allows our overall standard of living to rise. It allows us to use resources that would have been devoted to producing steel to be used to produce other goods and services.

However, the second implication of the increasingly competitive steel industry worldwide is a greater need to control costs. This drive to control costs will become even greater as worldwide over-capacity continues to mount. Within the U.S., it is likely to take the form of increasing resistance to unionization by steel-making firms and less willingness by management to acquiesce in substantial pay and benefit increases. Efforts by unions to win employment guarantees are also likely to be increasingly resisted. The alternative, for any individual producer, is to lose market share and profits to firms that do a better job of controlling costs.

As a consequence, the position of the steel workers as an industrial elite, earning wages substantially above the average everywhere in the world, is likely to erode. Wages in steel will continue to be high. Workers in steel are highly productive, and their pay will continue to reflect that. Work in steel will continue to be difficult and dangerous, and worker pay will reflect that. But 100% or more premia over average wages in manufacturing are likely to become a thing of the past.

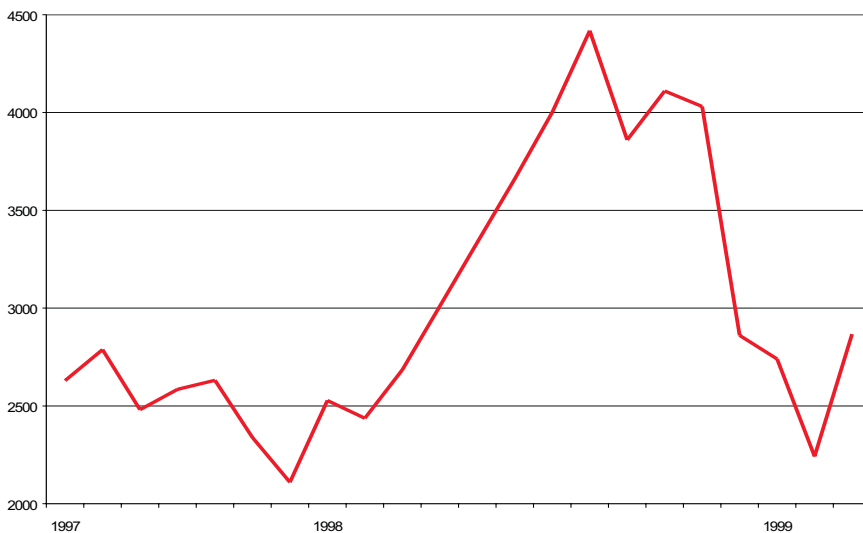
**Short-Term Competitive Pressures**

The factors discussed above reflect long-term adjustments for steel producers and for steel workers. But the industry also faces some short-term competitive pressures which have led to calls for short-term actions. The wisdom of some of these actions may be questionable.

Over the past year, steel output in the U.S. has fluctuated widely. Figure 1 shows, for the U.S. industry as a whole, the degree of capacity utilization (left scale). From a high of about 95% in early 1998, capacity utilization fell to about 72% near the end of 1998. Since then, capacity utilization has recovered somewhat, to about 80%, still below its level of a year and a half ago.<sup>9</sup>

**Figure 1** also shows weekly steel output for the Chicago area, in thousands of tons. Locally, output fell from about 570,000 tons per week early in 1998 to a low of about 460,000 tons in early 1999. Since then, local output has recovered to about 560,000 tons per week. The Chicago area's share of total steel output in the U.S. has, as a consequence, increased from 25% at the beginning of 1998 to nearly 29% most recently.

**Figure 2**  
U.S. Monthly Steel Imports, 1997-1999 (Thousands of Net Tons)



The major cause of the declines in steel output and capacity utilization during 1998 was increased international competition. The Asian currency crises, beginning in Malaysia and spreading throughout Asia (and, indeed, to Brazil and Russia) had two consequences.

First, those economies went into recessions, ranging from moderate (Singapore) to severe (Malaysia, Indonesia, Korea). The depressed economic conditions in those countries reduced their domestic demands for steel, inducing their domestic steel producers to look elsewhere for markets. In addition, demand for certain U.S.-produced goods, such as heavy construction and agricultural equipment, declined as those countries cut back their imports in response to lower income and output levels. These forces led to reduced demand for U.S.-produced steel directly (as some U.S. manufacturers reduced their orders) and indirectly (as foreign producers turned increasingly to U.S. markets).

Second, the currency crises led to declines in the value of certain foreign currencies (conversely, one can think of this as increases in the international value of the dollar). As foreign currencies become cheaper, U.S. businesses and consumers have an increased incentive to purchase imported goods and services, including steel. And they did. Directly, as steel imports, and indirectly as imports of products made with steel. As the

dollar becomes more expensive, businesses and people outside the U.S. have an increased incentive not to buy U.S.-produced goods, including those made with steel. And, again, they did what we would expect; they bought less from the U.S.

U.S. Steel producing firms have also argued that foreign steel producers have "dumped" steel in the U.S. (sold it below the cost of production). While judging whether this is true is difficult, we should note that firms can find it **profitable** on many occasions to sell a product at below its **average** cost of production. Suppose for example that the average cost of producing a certain grade of steel is \$400 per ton. But suppose that additional tons of that grade of steel can be produced at an additional (marginal) cost of \$300 per ton. It will be profitable to sell that **additional** steel at any price in excess of \$300 per ton, particularly if your choice is not to sell it at all.<sup>10</sup>

Politically, one response to the allegations of dumping has been to place some restrictions on steel imports. It appears, in fact, that much of the recovery in steel production has resulted from these import restrictions. (See **figure 2** for the changes in monthly imports during the 1997 to 1999 period.) Note that the consequence of this, however, is higher prices for steel sold to U.S. manufacturers, and thus higher costs of producing their products. This has consequences for their ability to compete in an increasingly competitive global marketplace as well.

### The Labor Situation

Finally, the steel industry faces a complex labor situation. Following optimism early in the year about the prospects for a quick and amicable settlement in this year's negotiations, it now appears that a settlement is not imminent.<sup>11</sup> Negotiators for USSteel are seeking ways to control their labor costs more closely, as we noted above in our discussion of the long-term consequences of an increasingly competitive world. While the United Steelworkers are seeking enhanced employment guarantees (for workers with 2+ years of seniority), USSteel seeks to reduce employment guarantees. Management is also seeking greater cost controls by shifting overtime pay calculations from a daily basis to a weekly basis and by increasing the amount of cross-training (especially by training workers in maintenance skills for the equipment they operate).

With contracts expiring this summer at USSteel, ISPAT, LTV, and Bethlehem, even a brief work stoppage will undermine the domestic industry's competitive position. This has historically been a problem for the steel industry, as periods of prosperity followed by periods of increased competition have undermined industrial peace.<sup>12</sup> With an August 1 deadline, there is still time for negotiations to conclude successfully, but, increasingly, there may be less room for optimism.

## Conclusions

The steel industry faces long-term structural problems, as it adapts to an increasing pace of technological change and an increasingly competitive market. For workers, there is the reality of on-going reductions in employment as productivity growth continues to outpace output growth. For individual firms, finding ways to cope with these changes represents their major strategic challenge for the future.

In the shorter term, economic fluctuations around the world and the continued strength of the dollar will confront the industry with increased international competition. In the absence of a labor agreement-if not labor peace-the domestic steel industry will be badly placed to respond to these short-term competitive challenges. How steel company management deals with these challenges will surely test their tactical skills at least as much as the structural changes test their strategic visions.

### It's Raw, It's Rolled (hot or cold), It's Pickled and It's Made in Indiana

The following list of steel plants in Indiana is not all-inclusive and does not include steel fabricators and processors. Where available, we have included the web addresses of these companies, as many have very good location information and some have photographs of the plants.

- AK Steel  
Rockport [under construction] ([www.aksteel.com](http://www.aksteel.com))
- American Steel Foundries  
Hammond
- Bethlehem Steel  
Portage ([www.bethsteel.com](http://www.bethsteel.com))
- Gary Steel Products  
Gary
- Inland-ISPAT  
Hammond ([www.inland.com](http://www.inland.com))
- LaSalle Steel  
Hammond
- LTV Steel  
East Chicago ([www.ltvsteel.com](http://www.ltvsteel.com))
- National Steel  
Portage
- Ottawa River Steel  
Hammond
- Republic Engineered Steel  
Gary
- Symco Industrial Fabricators  
Hammond
- US Steel  
Gary ([www.usx.com/ussteel](http://www.usx.com/ussteel))

Curious as to how steel is made? Check out this diagram on the web: [www.ltvsteel.com/htmlfiles/diagram2.htm](http://www.ltvsteel.com/htmlfiles/diagram2.htm)

## Notes

<sup>1</sup> American Iron and Steel Institute, "1999 Weekly Production by Geographic District," press release, May 15 1999. The Chicago area's share of total output cited in the text is for the week ended May 1, 1999.

<sup>2</sup> Indiana Department of Workforce Development, "Labor Market Letter: Gary-Hammond PMSA." Data are for March 1999. Total employment was 267,800; steel mill employment was 27,300.

<sup>3</sup> Bureau of Labor Statistics Data Home Page. Total establishment employment in March 1999 was 127,813,000; employment in steel mills and iron and steel foundries was 350,500.

<sup>4</sup> John Holowaty, Gary Lynch, and Leslie Singer, "Dinosaurs on the Lake: Steel in the Next Decade," *Indiana Business Review*, Spring 1993, 1-13.

<sup>5</sup> Iron and Steel Institute, "March 1999 Selected Steel Industry Data," press release. Mills using typical mini-mill technology apparently produced about 45% of total steel output in the first quarter of 1999.

<sup>6</sup> Similar technological changes have affected local telecommunications (the wireless revolution), business consulting (the power of personal computers), airlines (nimble, regional carriers and the "hub-and-spoke" organization strategy), among others.

<sup>7</sup> Iron and Steel Institute, "Steel: Basic Facts and Figures about the Steel Industry," [www.worldsteel.org/steelmaking/intro/index.html](http://www.worldsteel.org/steelmaking/intro/index.html).

<sup>8</sup> *Economic Report of the President 1999*, Table B-47.

<sup>9</sup> Iron and Steel Institute, "1998 and 1999 Weekly Raw Steel Production by Geographic District," [www.steel.org/stats98weekly.html](http://www.steel.org/stats98weekly.html) and [www.steel.org/stats99weekly.html](http://www.steel.org/stats99weekly.html)

<sup>10</sup> Airlines often do this; hence the phenomenon of multiple prices being charged for "identical" seats on a flight.

<sup>11</sup> Much of the following discussion is based on articles in *The Times*, most recently on June 8, 1999, A-1 to A-5.

<sup>12</sup> John Hoerr's *...And The Wolf Finally Came*, remains the definitive study of labor relations in the steel industry.