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THE IRON and STEEL INDUSTRY

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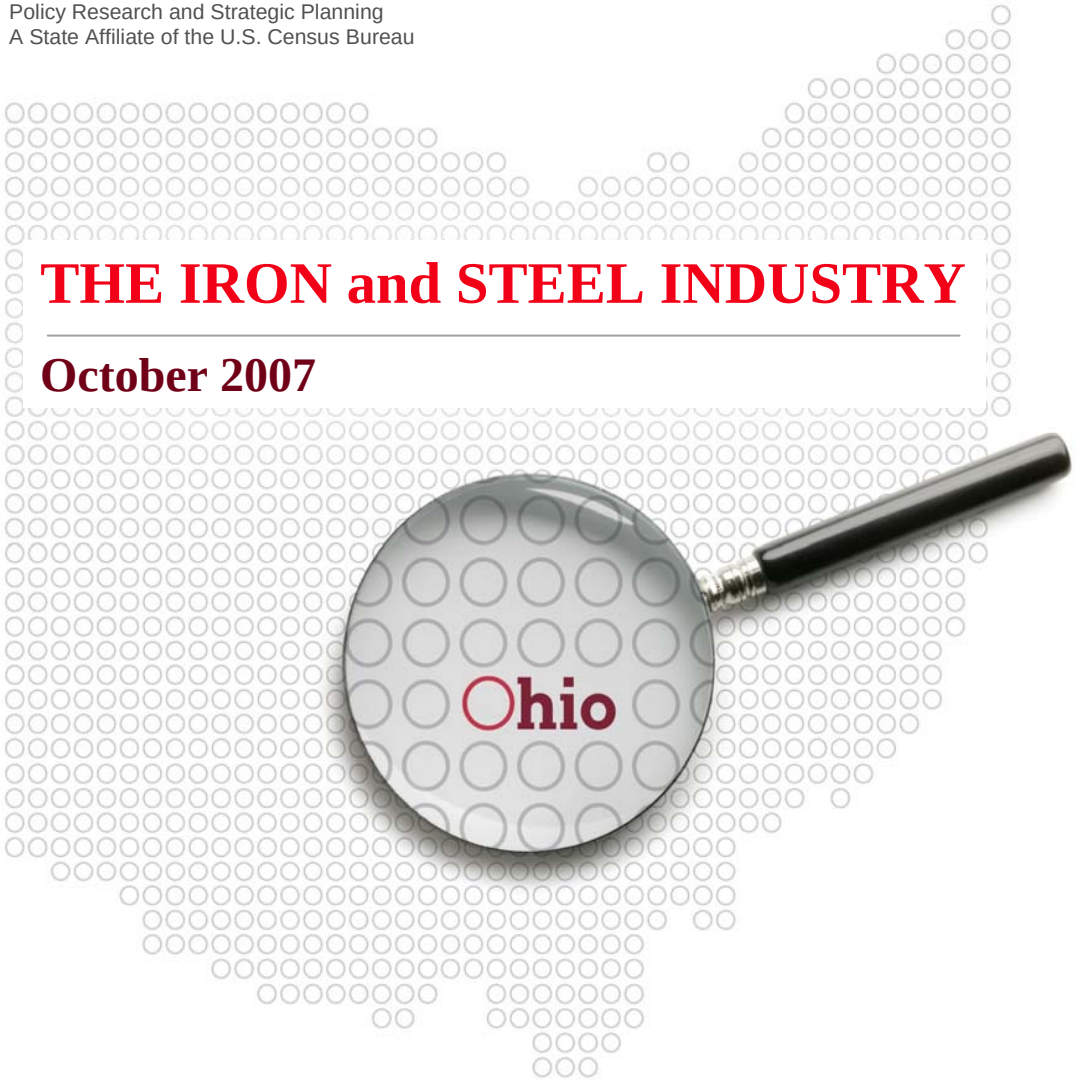

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OVERVIEW and FORECASTS

AN OVERVIEW OF THE INDUSTRY

U.S. steel production in 2006 was 5.7% higher than in 2005, but remained below the pre-recession peak of 2000 and the post-recession peak of 2004. Capacity utilization rates in 2006 were a fairly typical 87.9% – better than 2005, but below the recent peak of 2004. The 2006 figures reflect improvements in shipments to two key markets in particular – construction and motor vehicles – as well as most other steel consumers (Larkin, 2007).

The variations during the last few years illustrate the cyclical character of the industry and its sensitivity to changes in demand from key markets as well as the overall strength or weakness of the economy. The key markets for the industry are service/distribution centers[8] – 21.8% of all shipments in 2006, construction – 16.2%, motor vehicles – 12.9%, converting and processing – 7.9%, exports – 2.8%, containers – 2.3%, oil and gas – 2.3%, appliances – 1.6%, machinery – 1.3%, and electrical equipment – 1.1%. All other uses account for the remaining 29.8% of shipments (Larkin, 2007: 2).

Overall, the iron and steel industry tends to experience the most growth in demand late in the business cycle, due to the relatively greater impact of capital goods demand. (The demand for capital goods such as non-residential construction occurs late in the business cycle, and minimills dominate the market for steel used in construction.) Primary producers, though, are more closely tied to consumer durables – particularly cars and light trucks – than are minimills, and consequently are more of an early-cycle industry (Larkin, 2007: 22).

Beyond the business cycle, though, the iron and steel industry of today differs from that of years ago. Iron and steel production was a vertically integrated process dominated by large companies for much of the 20th century. The companies owned the materials and equipment used at each step of the process. These included the mines for iron ores, coal, and flux production, the coke ovens, blast furnaces and breakdown mills, and the service/distribution centers for steel slitting and sales to end users.

Today, the industry plays a smaller role in the economy, as evidenced by the reductions in raw steel production (see table A8), and only U.S. Steel comes close to being integrated since all of the remaining companies have divested significant portions of their assets.[7] Three factors are thought to largely explain this change: the rise of imports, the rise of minimills, and reduced demand for steel – most notably by the motor vehicle industry (Larkin, 2007: 18). The role of imports was discussed in the preceding section. How the latter two changed the industry is briefly described below.

Minimills make steel by recycling ferrous scrap in electric arc furnaces. (They may substitute directly reduced iron when scrap prices are high.) Doing so means that they avoid the costs associated with blast furnaces, coke ovens and equipment to handle raw materials. Consequently, their capital costs are much lower than primary producers – about $500 per

net ton of capacity vs. $2,000. This, combined with a leaner management structure, and more flexible, less costly labor arrangements, allows minimills to undercut the prices primary producers would charge for the same products. Minimills were initially limited to lower-quality commodity products. However, as their quality improved, they took progressively larger shares of the overall market from primary producers, forcing the latter to abandon markets for specific steel products. Minimills accounted for 8.4% of raw steel production in 1960; in 2006, they accounted for 57% (Larkin, 2007).

Changes in the motor vehicle industry exemplify the reduced demand for iron and steel products. Motor vehicle production directly and indirectly comprises about 25% of the market for iron and steel products. Two interrelated factors help explain its reduced demand: (1) the increase in imported motor vehicles displaced sales of U.S.-brand vehicles, and imported vehicles did not use domestically made iron and steel; and (2) the efforts of companies to improve fuel efficiency. The easiest way to improve fuel efficiency has been to reduce vehicle weight. To that end, motor vehicle manufacturers made vehicles smaller, and replaced some iron and steel components with ones made from aluminum, plastics, or even ceramics.[10] The shift of consumer preferences toward light trucks mitigated the losses of iron and steel makers because trucks use more steel (Larkin, 2005), but a shift away from light trucks (due to high fuel prices) would again dampen the demand for iron and steel.

The challenges of reduced demand for iron and steel products, as well as competition from imports, minimills, and manufacturers of alternative materials, elicited a number of responses from primary producers. Steel makers developed lighter and stronger products to compete with alternative materials, and near net shape casting reduced the need for machining parts. (See the Glossary and the Primer on Iron and Steel Production Processes in the Appendix.) Consequently, iron and steel makers regained some of the business lost to manufacturers of alternative materials. However, not all technological innovations have been unmixed blessings for primary producers. For example, advances such as thin slab- and strip-casting probably benefited minimills even more than primary producers. These innovations eliminated the need for high-cost reducing stands, thereby lowering the capital needed to compete in markets for higher quality goods such as pipes, plates, strips and sheets. Such items had been the domain of primary producers. Despite the gains of minimills in these markets, primary producers remain the source for the highest-grade goods (Larkin, 1994, 1995, 2005).

While technological advances reduced costs by improving operational efficiency, primary producers also reduced fixed costs by divesting at least some assets such as mines, coke ovens, or distribution/service centers.[11] A few companies went so far as to largely abandon primary production and concentrate on the production of specialty steels. However, implementation of this strategy has met with some unanticipated consequences. As demand increased, some companies found themselves short of capacity to produce slabs, and were thus compelled to buy them to make finished products. Some companies also were vulnerable to the sharp rise in material costs since 2001. These experiences led some companies to reverse course, pursuing vertical integration as a way of controlling costs (Larkin, 2007). Two companies with

operations in Ohio illustrate this trend. ArcelorMittal has decided to buy-out other owners (among them Cleveland-Cliffs) of Canada's Wabush Mines (Wire Report, 2007), and Wheeling Pittsburgh has formed a joint venture with a Brazilian iron ore producer and a Ukrainian steelmaker (Matthews, 2007a). Similarly, at least one minimill company formed a joint venture with mining company to secure a supply of directly reduced iron, and another one purchased a scrap dealer. Both actions were taken to control the costs of their raw materials (Larkin, 2007).

2001 also marked the last major downturn in the industry, with several primary producers forced into bankruptcy. Some had been in bankruptcy before, but this time they did not emerge. Instead, some of their assets were purchased as part of the liquidation process. This became feasible and attractive when the Pension Benefit Guaranty Corp. (PBGC) assumed the pension plans and health care benefits of the liquidating companies.[12] Such asset purchases by surviving companies are part of the international consolidation of the industry. One example from Ohio illustrates these changes. W.L. Ross formed the International Steel Group (ISG) by purchasing assets of LTV, Bethlehem and Weirton. ISG's management structure resembled that of a minimill, and it produced 90% of what LTV did with only one-fourth of the production workers. ISG's merger with Ispat International NV formed Mittal NV. In turn, the merger of Arcelor with Mittal creates the world's largest steel company (Larkin, 2005, 2007).[13]

The responses of primary producers to the challenges described above have at their core an effort to reduce costs to remain competitive. Although the efforts have not always been successful – primary producers have closed facilities and reduced the number of employees – they continue with this quest. Currently they are reducing costs by moving to defined-contribution retirement plans and away from defined-benefit plans. Other measures taken to control costs include reducing the size of the work force – including fewer levels of management, and changing work classifications to permit greater flexibility in what people do (Larkin, 2007: 12).

Mergers also have been a way to deal with the increased competition in the steel industry. In 2001, eight companies still accounted for some 50% of raw steel shipments: by 2006, four companies accounted for 43.7% of shipments. Those four included two minimills – Nucor and Steel Dynamics – and two primary producers – AK Steel and U.S. Steel (Larkin, 2007: 11).

THE NEAR- AND LONG-TERM FORECASTS

Through June 16, 2007, national steel production totaled 48.0 million tons, compared with 51.7 million tons during the same period in 2006. This decline of 7.2% reflects the much slower growth of the economy in general as well as the weakness in three key markets. Motor vehicle production through May, 2007, was 5.2% lower than the same period of 2006, and shipments to construction and distribution centers through April, 2007, declined by 1.1% and 7.3% respectively, compared with the first four months of 2006. However, the weakness seen in key markets during the first half of 2007 is expected to ease in the second half. For these reasons, Larkin (2007: 1-2) predicts that total steel shipments for the year will be only 1%-to-2% below that of 2006. This also implies that total year production may be slightly lower as well.

Beyond the variations of the business cycle, some of the recent trends discussed in preceding sections are expected to continue for the foreseeable future. Perhaps the most notable is industry consolidation. Despite the mergers of recent years, the industry can still be described here and abroad as fragmented, and the conditions making mergers possible and advantageous still exist. These include low borrowing costs, high stock prices, large amounts of cash, continuing competition, and the high cost of raw materials and ferrous scrap. Companies created by mergers or supplemented by acquisitions may have more control over raw materials, or may be able to obtain more favorable terms when purchasing them (Larkin, 2007: 5; Matthews, 2007c). It is also possible that foreign-based companies will own about 40% of domestic capacity by the end of 2007, and it could continue growing (Larkin, 2007: 16; Matthews, 2007b).

A graph shown earlier in this report illustrated how imports varied over the years in meeting demand in the American steel market. Such variation seems a testament to the difficulty of forecasting, and arguments can be made for changes either way. Larkin (2007: 3, 17) thinks that steel imports in 2007 (and perhaps beyond) are likely to decline from the record level of 2006 for a number of reasons: prices for domestically made products – and the value of the dollar – are expected to drop; the consolidation of the domestic industry has resulted in considerable cost reduction, and it is far more competitive vis-à-vis foreign rivals; and the increased costs of raw materials and transportation have reduced the cost advantages of foreign steel makers. Matthews (2007b) goes further, noting that these are reasons for foreign-based companies to set up operations here, either by themselves, or in joint ventures with domestic companies. Larkin (2005) also speculates that the international nature of the mergers could mitigate trade disputes; if a foreign-based company experiences a weak home market, would it aggressively ship products to America when such shipments would hurt its American operations?

On the other hand, lower prices in China, whose currency is still more or less pegged to the value of the dollar, could keep import levels high. The emergence of China as a net exporter of steel could lead to a global steel glut, but it is highly unlikely that any nation, including the U.S., will allow Chinese producers to flood its market. “While the United States has the least amount of import restrictions of any nation, US [sic] producers have, from time to time, had the US government im-

pose restraints on imports in the form of quotas, tariffs, and voluntary restraint agreements. We [i.e., Standard & Poor's] believe that any attempt by China to swamp the US market with surplus steel would be met with demands for protectionist measures and the filing of antidumping suits" (Larkin, 2007: 17).

Other factors previously mentioned will continue to affect the industry over the long term. It is possible that producers of alternative materials – particularly aluminum – will make further inroads into the markets of steel producers in the long term. It is unlikely, though, that they will further displace iron and steel in motor vehicles in the near term for two reasons: all of the easy substitutions have been made, and steel is easier to recycle than are automotive plastics (Larkin, 2005).

Technological improvements continue to be made. For example, WCI is installing a walking beam furnace, which is expected to reduce energy costs and facilitate custom production. It also is working to use fuel oil and natural gas as alternatives to coke, as well as considering pulverized coal injection; both could reduce expenses (Vinarsky, 2007).

Larking (2005) believes that some technological improvements may benefit minimills more than primary producers, allowing the former to make further gains in the sheet market. However, future gains of market share by minimills may be limited by the high price of scrap. As this is written, there is only one minimill under construction, and there are no plans to build more in the immediate future. High scrap prices affect primary producers to a lesser degree because they typically use a 3-to-1 ratio of pig iron to scrap in steel production (Larkin, 2007: 10). However, the longer-term outlook for primary producers is more problematic because they may not be able to count on high prices – whether of scrap, raw steel, or finished products – to stay in business (Larkin, 2005).

These long term challenges may be why Berman (2005) forecasts average annual rates of growth for the two iron and steel groups that are slower than for the U.S. economy as a whole: 1.6% each for iron, steel, and ferroalloy production (NAICS 3311) and products made from purchased steel (3312), vs. 3.6% for the decade of 2004-2014. If these forecasts for the two groups come to pass, they would be an improvement from the preceding decade (1994-2004) when the output of both was lower in 2004 than in 1994. (The U.S. economy grew at an average annual rate of 3.2% during the decade.) Nevertheless, the iron and steel industry is expected to play a relatively smaller role in the economy than in the past.

Unfortunately, the improved forecasts for the industry groups are not expected to translate into more industry jobs. Berman (2005) predicts employment in iron and steel mills and ferroalloys will fall from the 95,400 of 2004 to 80,300 in 2014 – a 15.8% drop, and employment in products made from purchased steel will decline by 5,800 to 55,000, or 9.5%, during the same time. The Ohio Dept. of Job and Family Services' Bureau of Labor Market Information (ODJFS-BLMI, 2007) predicts proportionally similar declines for the same time period. Employment in iron and steel mills and ferroalloys is forecast to fall from 13,600 to 11,100 – or 18.4%, and employment in products made from purchased steel expected to decline by 1,300 to 8,100 – about 13.8%.

The use of the Internet to link manufacturers, distributors and suppliers has grown, but a number of specific ventures have failed. Ultimately, though, Internet usage is expected to do a number of things for buyers and sellers: provide more information, match production and order flows, and reduce expenses. Consequently, the role of establishments that just warehouse metal will be reduced, but those that offer further processing will remain (Larkin, 2007: 22).

See Table A13