CHAPTER 7: The Steel Service Center Industry

This chapter examines the role of the steel distribution industry in the heart of the American steel market: Chicago. While steel mills have traditionally distributed over 80 percent of the steel produced in this country, a small, independent wholesale trade sector in steel has been rapidly gaining in market share. Just as domestic steel production is concentrated in Chicago, this growing service sector is also centered in the City.

The steel service center industry is a crucial link in the chain of steel producers and steel users that forms the backbone of our manufacturing sector. Poised between producer and consumer, service centers meet manufacturers' demand for steel through their domestic and international network of suppliers. This crucial component of the steel industry, however, is rarely considered in studies of the crisis in American steel. This chapter provides the missing background, analyzing the role played by steel distributors.

7.1 Services Centers Growing Role

The share of domestic steel distributed by steel service centers has increased by 50% in the years since World War II. Roughly a quarter of all steel produced in the United States is currently distributed by steel service centers, and industry officials anticipate this market share will rise to around 40% within the next decade (Table 7.1). While the quantity of domestic steel handled has actually declined since 1973/74, the total volume at steel service centers has been boosted by distribution of imported steel.
<table>
<thead>
<tr>
<th>Year</th>
<th>Shipments to Service Centers</th>
<th>Total Mill Shipments</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>9,571</td>
<td>57,242</td>
<td>16.7%</td>
</tr>
<tr>
<td>1946</td>
<td>9,305</td>
<td>48,776</td>
<td>19.1</td>
</tr>
<tr>
<td>1947</td>
<td>10,484</td>
<td>63,057</td>
<td>16.6</td>
</tr>
<tr>
<td>1948</td>
<td>11,406</td>
<td>65,973</td>
<td>17.3</td>
</tr>
<tr>
<td>1949</td>
<td>10,220</td>
<td>58,104</td>
<td>17.6</td>
</tr>
<tr>
<td>1950</td>
<td>13,360</td>
<td>72,232</td>
<td>18.5</td>
</tr>
<tr>
<td>1951</td>
<td>14,399</td>
<td>78,929</td>
<td>18.2</td>
</tr>
<tr>
<td>1952</td>
<td>13,329</td>
<td>68,004</td>
<td>19.6</td>
</tr>
<tr>
<td>1953</td>
<td>14,879</td>
<td>80,152</td>
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<td>1954</td>
<td>11,999</td>
<td>63,153</td>
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</tr>
<tr>
<td>1955</td>
<td>15,758</td>
<td>84,717</td>
<td>18.6</td>
</tr>
<tr>
<td>1956</td>
<td>16,752</td>
<td>83,251</td>
<td>20.1</td>
</tr>
<tr>
<td>1957</td>
<td>14,504</td>
<td>79,895</td>
<td>18.2</td>
</tr>
<tr>
<td>1958</td>
<td>10,902</td>
<td>59,914</td>
<td>18.2</td>
</tr>
<tr>
<td>1959</td>
<td>13,049</td>
<td>69,377</td>
<td>18.8</td>
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<tr>
<td>1960</td>
<td>12,480</td>
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<td>1961</td>
<td>12,365</td>
<td>66,126</td>
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<td>1962</td>
<td>12,269</td>
<td>70,552</td>
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<tr>
<td>1963</td>
<td>13,149</td>
<td>75,555</td>
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</tr>
<tr>
<td>1964</td>
<td>15,564</td>
<td>84,945</td>
<td>18.3</td>
</tr>
<tr>
<td>1965</td>
<td>16,369</td>
<td>92,666</td>
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<tr>
<td>1966</td>
<td>16,400</td>
<td>89,995</td>
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<tr>
<td>1967</td>
<td>14,863</td>
<td>82,897</td>
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</tr>
<tr>
<td>1968</td>
<td>16,099</td>
<td>91,856</td>
<td>17.5</td>
</tr>
<tr>
<td>1969</td>
<td>17,565</td>
<td>93,877</td>
<td>18.7</td>
</tr>
<tr>
<td>1970</td>
<td>17,678</td>
<td>90,798</td>
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<td>1971</td>
<td>16,184</td>
<td>87,038</td>
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<tr>
<td>1972</td>
<td>18,597</td>
<td>91,805</td>
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</tr>
<tr>
<td>1973</td>
<td>22,704</td>
<td>111,430</td>
<td>20.4</td>
</tr>
<tr>
<td>1974</td>
<td>23,178</td>
<td>109,472</td>
<td>21.2</td>
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<tr>
<td>1975</td>
<td>15,622</td>
<td>79,957</td>
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<td>1976</td>
<td>14,615</td>
<td>89,447</td>
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</tr>
<tr>
<td>1977</td>
<td>15,346</td>
<td>91,147</td>
<td>16.8</td>
</tr>
<tr>
<td>1978</td>
<td>17,333</td>
<td>97,935</td>
<td>17.7</td>
</tr>
<tr>
<td>1979</td>
<td>18,246</td>
<td>100,262</td>
<td>18.2</td>
</tr>
<tr>
<td>1980</td>
<td>16,172</td>
<td>83,853</td>
<td>19.3</td>
</tr>
<tr>
<td>1981</td>
<td>17,636</td>
<td>87,014</td>
<td>20.3</td>
</tr>
<tr>
<td>1982</td>
<td>13,067</td>
<td>61,567</td>
<td>21.2</td>
</tr>
<tr>
<td>1983</td>
<td>16,709</td>
<td>67,584</td>
<td>23.3</td>
</tr>
<tr>
<td>1984</td>
<td>15,713</td>
<td>67,454</td>
<td>24.3</td>
</tr>
</tbody>
</table>

Source: Steel Service Center Institute, Total Domestic Shipments, 1984c.
Steel service centers are growing in market share as restructuring of both steel using and steel producing sectors creates new opportunities and roles for the industry. The traditional roles of service centers included supplying steel orders smaller than the mills' required order size of 20 tons, and absorbing and marketing the steel mills' secondary materials and production overruns. Today, in the face of significant shifts in steel supply and demand, these roles have diminished in importance, and the service center industry is assuming a more central position in manufacturing.

Changes in demand that have increased the importance of steel service centers stem from changes in types of steel product demanded, changes in location of manufacturing, and changes in methods of inventory control. Steel demand is increasingly for lighter products used in growing high-tech industries, or to meet new, energy efficient standards. Manufacturers are demanding that suppliers provide more processing services, stricter quality assurances and growing inventory control assistance for these products. As domestic steel mills retrench their production operations, they can no longer fully meet market demand for either new products or new services. Steel service centers are filling the market gap.

Moreover, as population and industry centers have shifted in the last twenty years, steel consumption has grown at above average rates in regions of the United States where little efficient steel making capacity exists. Due to high overland freight costs, the rustbelt region no longer acts as the sole "home market" for the domestic steel industry (Mueller, 1985). As the South, Southwest and West Coast have hosted dramatic manufacturing growth, foreign steel producers have
found it easy to fill the new order for steel in these regions. Steel
service centers, important conduits of imported steel, are also
filling regional market gaps.

Changes in supply that enhance the role of service centers have
occurred in response to changes in demand. Increased demand for
different grades and higher qualities of steel has not been met by
domestic steel mills, encouraging the importation of foreign steel
products made in newer mills and of higher quality. In a circular
fashion, this has impacted the profits of the domestic mills, forcing
rationalization and further opening the door to greater market pene-
tration by foreign producers. Many of the steel producers are laying
off most of their marketing staff and concentrating their marketing
efforts on their largest customers. Here, too, the steel service
centers are filling in, taking on an increasing share marketing and
distribution of domestic steel products.

As less steel is produced and distributed by domestic mills,
steel service centers fill the gap with steel from their international
network of suppliers. While the domestic market for steel is growing
at an estimated .9% (Mueller, 1985) to 1.7% per year (American Metal
Market, 4/13/85), domestic steelmaking capacity is being steadily
reduced. Imports of steel, distributed through steel service centers
and other types of steel wholesalers, will make up the growing differ-
ence between supply and demand. This is why trade literature fre-
quently features steel service centers as the only thriving element in
the depressed steel industry.

Changes in domestic distribution of steel will be controlled from
Chicago, the heart of both steel production and distribution. The
metal distributing industry is one of the most concentrated of the wholesale trades, and the center of that domestic concentration is Chicago, where steel mills, distributors, and manufacturers form a vast industrial agglomeration. The country's largest steel service center firms supply their national network of plants from Chicago warehouses.

The important consequences of this concentration of steel distribution in Chicago include a local supply of all steel products at competitive prices from international and domestic producers: a rapid dispersion of innovations in methods of inventory control; and as stable a supply of steel as anywhere in the country. The concentration of steel service centers in Chicago bodes well for the Chicago manufacturing complex, regardless of the woes of the domestic steel producers.

7.2 Industry Definition, Products and Services

Steel service centers form the largest customer group of the domestic steel industry. Their function, however, is different from other steel customer groups. Service centers are a channel for distribution of steel mill products. They primarily serve two markets: the "Original Equipment Manufacture" market (capital goods market), and the "Maintenance Requirement Orders" market, which is formed by the occasional needs of all manufacturers for specialized shipments of steel to repair machinery, or for onsite construction and building maintenance.

Steel service centers are classified under the broad industry classification of wholesalers. Wholesalers typically add value to the goods and services they distribute by the simple process of buying and
storing materials in anticipation that someone else will have a need for the goods at a future time. Within the steel distribution industry, there are a variety of firms that provide primarily wholesalers' or brokers' functions. Agents, brokers, traders, importers, and the steel mills themselves (through their manufacturers' sales branches and offices) act as steel wholesalers and distributors.

The steel service center industry is distinguished from the rest of the industry by the services offered to a client. Service centers offer a variety of processing services which allow them to provide steel of specific size, shape, quality and quantity. Sophisticated slitting, shearing and other shaping equipment featured by most service centers eliminates the need of each customer to maintain the machinery for themselves. In addition, steel service centers hold inventory for their clients and supply steel products on a rapid-delivery basis, eliminating many of the costs associated with holding inventory.

The industry has continued to upgrade their service delivery, and their important role in controlling production expenses is featured in the trade association's standard listing of the "Costs of Possession" (Table 7.2). The rising interest costs of the mid-seventies riveted manufacturers' attention to the cost of inventory, which is most frequently financed from outside sources. Managers installed "Materials Requirement Planning," an automated inventory control system. This production innovation was followed in the United States in the late 1970s by the auto industries' introduction of "Just-in-Time" delivery. This technique, invented by Toyota Motors, shifts the
Table 7.2. Costs of Possession

1. Housing Costs
   A. Building depreciation
   B. Building operating costs
   C. Taxes
   D. Insurance

2. Capital Costs
   A. Cost of borrowing
   B. Inventory taxes
   C. Inventory insurance
   D. Materials obsolescence

3. Scrap Costs
   A. Scrap loss

4. Equipment Costs
   A. Materials handling equipment depreciation
   B. Preprocessing equipment depreciation
   C. Electric power and special supplies
   D. Servicing and repair

5. Labor Costs
   A. Wages and benefits of people who receive and stack raw materials
   B. Wages and benefits of those who move metals to pre-processing areas
   C. Wages and benefits of people who process the metal

6. Delivery Costs
   A. Cost of cargo damaged in transit not covered by insurance, or
   B. Cost of insurance

7. Costs of System Failure
   A. Equipment breakdown
   B. Loss of customer goodwill through late delivery of goods based on in-plant system breakdown.

Source: Steel Service Center Institute, Delphi Survey, 1984a.
inventory burden to the supplier who delivers materials used in production directly to the assembly line every few hours (Ohno, 1982).

Innovative methods of cutting production costs through rapid delivery of materials or automated ordering systems enhance the role of steel service centers throughout the country. Most steel service centers strive to offer a standard delivery time of 24 to 48 hours after the order has been placed. (Some firms have even installed radios in their trucks for emergency orders.) This contrasts with a minimum of four to six weeks from a domestic mill, and eight weeks or longer from a foreign producer.

The rising market share of service centers demonstrates the growing importance to domestic manufacturers of cutting the "costs of possession." This is especially true in the capital goods market, which faces stiff competition in international markets. The share of domestic industrial carbon steel, passing through steel service centers and destined for original equipment manufacturers has risen by almost 100 percent since the early 1960s (Table 7.3). This indicates that service centers are becoming broadly integrated into the manufacturing process.

Steel is the primary product stocked and distributed by steel service centers. But by no means is it the only product handled by the industry. Many service centers stock products made of other metals, industrial plastics and ceramics. As manufacturers begin to substitute alternative materials for steel, steel service centers also begin to stock and supply the substitute materials. Steel remains the primary material used in most manufacturing, however, and continues to dominate the inventory of the steel service centers.
Table 7.3. Domestic Steel Shipments to Service Centers, 1962-1983. Percent of industrial steel product shipments as compared to percent of total steel product shipments (tons)

<table>
<thead>
<tr>
<th>Years</th>
<th>Percent Industrial Products</th>
<th>Percent Total Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>15.2</td>
<td>17.4</td>
</tr>
<tr>
<td>1972</td>
<td>21.2</td>
<td>18.6</td>
</tr>
<tr>
<td>1974</td>
<td>22.0</td>
<td>21.2</td>
</tr>
<tr>
<td>1975</td>
<td>19.0</td>
<td>19.5</td>
</tr>
<tr>
<td>1981</td>
<td>25.2</td>
<td>20.3</td>
</tr>
<tr>
<td>1982</td>
<td>28.0</td>
<td>21.9</td>
</tr>
<tr>
<td>1983</td>
<td>29.4</td>
<td>23.2</td>
</tr>
</tbody>
</table>

Source: Steel Service Center Institute, Mills, Service Centers, 1984b.
In the second quarter of 1984, domestic steel mills shipped approximately 28 percent of their total output to service centers. Over one-third of all domestically produced sheet, the single largest product line of both domestic producers and distributors, was distributed through steel service centers. Pipe and tubing, plate, structural products and bar are other major products distributed by steel service centers (Table 7.4). Although the absolute tonnage is lower, a much higher proportion of stainless steel products than carbon steel products is distributed through service centers. In 1984, for instance, 86.3% of all domestically produced stainless steel cold rolled bar and 64.4% of domestic stainless hot rolled bar passed through service centers.

The steel service center industry's importance to manufacturing is magnified by the volume of imported steel it supplies. In 1982, American Metal Market estimated that 35 percent of imported steel was distributed through steel service centers. Those products with the highest ratio of imports to domestic products figure significantly in the product mix of service centers. The implication of such a parallel is that service centers have "cornered the market" on some products and are the major supplier between domestic and international producers and domestic end-users.  

### 7.3 Industry Structure

The steel service center industry has not been analyzed in the body of literature on the American steel industry. In part, this is because of its traditionally minor role in the steel industry. In addition, barriers to entry are low, and companies spring up or vanish practically overnight. Competition is stiff within the industry, and
Table 7.4. Mill Shipments by Product Line to Steel Service Centers in 1983 (Absolute Tons)

<table>
<thead>
<tr>
<th>Product</th>
<th>Tons</th>
<th>% of Service Center Inventory</th>
<th>% of total Industry Shipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot-Rolled Sheet</td>
<td>4,672,011</td>
<td>33.2</td>
<td>44.3</td>
</tr>
<tr>
<td>Cold-Rolled Sheet</td>
<td>3,776,714</td>
<td>26.9</td>
<td>29.1</td>
</tr>
<tr>
<td>Galvanized Sheet</td>
<td>1,926,765</td>
<td>13.7</td>
<td>35.1</td>
</tr>
<tr>
<td>(hot dipped)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plates, U.M. (sheared)</td>
<td>971,312</td>
<td>6.9</td>
<td>34.6</td>
</tr>
<tr>
<td>Structuralss</td>
<td>386,990</td>
<td>2.8</td>
<td>14.2</td>
</tr>
<tr>
<td>Hot-Rolled Bar</td>
<td>327,995</td>
<td>2.3</td>
<td>8.6</td>
</tr>
<tr>
<td>Cold-Rolled Sheet (stainless)</td>
<td>318,034</td>
<td>2.3</td>
<td>56.3</td>
</tr>
<tr>
<td>Cold-Finished Bar</td>
<td>203,400</td>
<td>1.4</td>
<td>20.9</td>
</tr>
<tr>
<td>Coated Sheet</td>
<td>166,535</td>
<td>1.2</td>
<td>17.6</td>
</tr>
<tr>
<td>(not galvanized or hot dipped)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural Pipe &amp; tubing</td>
<td>141,976</td>
<td>1.0</td>
<td>59.9</td>
</tr>
</tbody>
</table>

companies jealously protect their market information. Annual reports, the best source of industry information, are difficult to obtain as the majority of steel service centers are privately owned, or are subsidiaries of companies like Inland (Ryerson) or Bethlehem (Tull).

In addition to problems associated with a lack of reliable industry data, it is difficult to describe the steel service center industry because definitions of products, functions, markets and services vary over time and from region to region. While many steel service centers have regional markets, some sell locally, and some sell nationally. Some distribute products on a retail basis, and others sell quantities as large as any steel mill. Some service centers sell only a few products to a narrow market, while others are likened to supermarkets. Some offer many specialized services, while others offer no services at all. Customer base can change dramatically based on phases of the business cycle.

The service center industry itself could be divided into three categories by size: very large "supermarket" or depot establishments that carry a broad and diverse inventory and supply a large, regional market area; medium sized establishments that specialize in local products or industry-specific product lines; and very small, specialized establishments that cater to a national market with one or two exotic products.

Two major trends are changing the structure of the steel service center industry. First, financial pressures are creating a wave of consolidation throughout the industry. Considerable pressure to upgrade services and equipment to meet the stringent time and quality demands of new inventory control methods comes at a time of highly
competitive market, cutthroat pricing, and high interest rates. As a result, many service centers are merging, going out of business, or selling out to larger companies. The medium-sized, local serving, independent service center, the traditional backbone of the industry, is expected to be especially affected. This trend is expected to change industry configuration from a three tier structure to a two tier structure composed of the largest firms and their branch plants, and small companies that feature an exotic product line.

The second major trend in the steel service center industry is that of foreign ownership, brought about by foreign mills' desire to keep a foot in the door of the American steel market regardless of changing trade barriers. This trend is more prominent in coastal regions where foreign producers are more firmly entrenched.

In Chicago, the steel service center industry is clearly dominated by a few very large firms whose headquarters or main depots are located within the 6-county metropolitan region. Out of a total of 50,000 service center employees in the area, about a third work at the plants of the industry leaders: Central Steel and Wire, A.M. Castle, Ryerson Metals or Jorgenson. The total of 287 service centers listed in the 1984 Chicago telephone book, however, reveals the continuing importance of the smaller service center in the local market for steel.

Anecdotal evidence indicates that the industry trends described here are at work in the Chicago market. Consolidation, low profit margins, and financing difficulties, problems that commenced during the 1982 recession, still continue, although the largest firms are rebounding or were unaffected. The new inventory control techniques
are heavily used by the local automotive and agricultural equipment industries, increasing the role of the Chicago steel service center to the large end users. Although foreign ownership of service centers in the region has grown, the most noticeable phenomenon in ownership in the Chicago area has been purchase of service centers by huge commodity trading firms such as Philbro Solomon or Cargill. This trend reflects a fundamental change in the nature of wholesale trade, however, rather than a trend unique to the steel distribution industry.

7.4 Location Decisions of Steel Service Centers

Traditionally, a wholesaler achieves a profit by providing the service of linking suppliers with customers in the most economically efficient fashion. Location of wholesale plant depends on factors of supply, demand, and transportation costs. Location decisions of steel service centers depend primarily on these factors, although size and scale of the plant within the industry hierarchy have an important bearing on location (Table 7.5).

The important growth in the steel service center industry is expected to accrue to the largest of the steel service centers, the supermarket establishments that serve a large regional or national market. Local-serving steel service centers already have 100% of the market of small customers. Market share gains will come as service centers take on mill customers, delivering steel in mill quantity to the largest end-users on a just-in-time basis. Thus, employment gains and growth in the steel service center industry will occur primarily at headquarters or depot plants, and at branch plants of the largest steel service center chains.
Table 7.5. Scope of Operations of Steel Service Centers

<table>
<thead>
<tr>
<th>Operation</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>49%</td>
</tr>
<tr>
<td>Regional</td>
<td>38%</td>
</tr>
<tr>
<td>National</td>
<td>13%</td>
</tr>
</tbody>
</table>

Source: Steel Service Center Institute, Total Domestic Shipments, 1984c.
The headquarters and depot plants of the largest steel service center companies are located near important points of supply: Edgecomb Steel on the East Coast, Jorgenson in Los Angeles, A.M. Castle, Central Steel and Wire, and Ryerson in Chicago. For this type of plant, access to varied sources of supply (ports and mills) proves the most important locational consideration. Economies of scale are available through discounts offered by mills and trading companies for purchasing in bulk volume. Economies in long-distance hauling gained through deregulation of transportation industries reinforces concentration of the industry in centers of supply. The depot plants supply their branch plants and other customers from centers of steel supply.

Supply of steel in the United States remains concentrated in the Midwest, although the coastal ports provide increasingly important regional supply centers. Coastal states, including California, Texas and New York, are leading steel service center employment centers (Table 7.6). Chicago, however, was beaten only by Houston in growth of service center plants between 1979 and 1982. An analysis of location quotients for the steel service center industry in selected SMSAs shows that employment is three times as concentrated in regional coastal supply centers, and in Chicago, as is typical for the nation as a whole (Table 7.7).

The second tier of the steel service center industry, consisting of medium-sized independent firms or branch plants of the largest companies, serves local or regional markets with a product mix unique to the industry of their area. Within the region, product mix is largely undifferentiated, and market boundaries are more or less fixed because of the expense of shipping steel. Thus, intermediate steel
Table 7.6.  Number of Service Center Establishments in Leading States and SMSAs, 1977-1982

<table>
<thead>
<tr>
<th>States</th>
<th>1977</th>
<th>1972</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>829</td>
<td>717</td>
<td>+112</td>
</tr>
<tr>
<td>New York</td>
<td>823</td>
<td>840</td>
<td>+45</td>
</tr>
<tr>
<td>Texas</td>
<td>769</td>
<td>567</td>
<td>+202</td>
</tr>
<tr>
<td>Illinois</td>
<td>708</td>
<td>579</td>
<td>+129</td>
</tr>
<tr>
<td>Ohio</td>
<td>643</td>
<td>570</td>
<td>+73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SMSAs</th>
<th>1977</th>
<th>1972</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>620</td>
<td>573</td>
<td>+107</td>
</tr>
<tr>
<td>New York City</td>
<td>543</td>
<td>603</td>
<td>-60</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>443</td>
<td>398</td>
<td>+45</td>
</tr>
<tr>
<td>Houston</td>
<td>360</td>
<td>242</td>
<td>+118</td>
</tr>
<tr>
<td>Cleveland</td>
<td>280</td>
<td>250</td>
<td>+30</td>
</tr>
</tbody>
</table>

Table 7.7. Location Quotients for the Steel Service Center Industry in Selected SMSAs, 1982

<table>
<thead>
<tr>
<th>City</th>
<th>Location Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houston</td>
<td>3.71</td>
</tr>
<tr>
<td>Portland</td>
<td>3.10</td>
</tr>
<tr>
<td>Chicago</td>
<td>3.03</td>
</tr>
<tr>
<td>Seattle</td>
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<tr>
<td>San Francisco</td>
<td>1.63</td>
</tr>
<tr>
<td>New Orleans</td>
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<tr>
<td>Milwaukee</td>
<td>.84</td>
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<tr>
<td>Lexington</td>
<td>.64</td>
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<tr>
<td>St. Louis</td>
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<tr>
<td>Peoria</td>
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<td>.80</td>
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</tr>
<tr>
<td>Nashville</td>
<td>1.29</td>
</tr>
</tbody>
</table>

service centers compete on a basis of price and services within a geographically restricted market.

Both of these factors of competition lead to central SMSA location as the most economical site for a steel warehouse. Metropolitan locations provide the best access to transportation routes for receiving and delivering shipments of steel via truck, rail or water. Because of the service orientation of the industry, the "neighborhood effect" is very important to maintaining and increasing market share. Proximity encourages a relationship in which the supplier and customer have intimate knowledge of each others' problems and needs, and is a key source of competitive advantage (Hayes and Wheelright, 1984).

Thus, steel service centers will seek out metropolitan locations because service orientation demands proximity to manufacturing customers to gain competitive advantage in a limited and competitive market. As a supplier to suppliers (steel service centers traditionally served the capital goods manufacturers and makers of parts for the auto or appliance industry), industrial agglomeration is an important attraction to steel service centers. As delivery response time becomes more important to companies throughout the manufacturing chain, the importance of agglomeration in the location decisions of steel service centers will increase.

Steel service centers, like most warehousing industries, find locations that offer low land costs and decreased traffic congestion the most attractive. These sites have tended to be found on the urban fringes in the last 20 years. Newer manufacturing areas, however, host a more concentrated local industry.
An examination of Midwestern SMSAs shows that a manufacturing population of at least 15,000 is needed to support the development of a local steel service center industry (Table 7.8). The steel service center industry in rural, inland manufacturing SMSAs such as Lexington, Nashville and Kansas City is concentrated primarily in the one county where the manufacturing employment is the highest. By contrast, the industry is more dispersed throughout the older industrialized urban areas of Cleveland, Pittsburgh and Chicago.

More recently industrialized areas have been able to take advantage of improved economies in long distance transportation. "Piggyback" container transport, increased coordination of railroad freight structures, and economies gained through backhauling permitted by deregulation have permitted steel customers in these regions to be served more economically from a centralized location. Thus, the newer industrial areas show a tendency to have all manufacturers served out of a single concentration of steel service centers in the center of the metropolitan area, instead of featuring a steel service center industry spread around the urban fringes.

The new economies available through long distance shipping reinforce the already locationally concentrated nature of the steel service center industry. Concentration in the steel service center industry increased in the Midwest between 1977 and 1982. Cities such as St. Louis, Milwaukee, Peoria and Cincinnati, located close to a major source of steel supply (Chicago and Pittsburgh) are losing service center jobs at a much faster rate than they are losing manufacturing jobs. Pittsburgh and Chicago and other supply centers, on the other hand, are gaining in service center employment despite
<table>
<thead>
<tr>
<th>Place</th>
<th>Service Center Employment</th>
<th>Manufacturing Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chicago</strong></td>
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</tr>
<tr>
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</tr>
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<td>12,382</td>
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<td>66,975</td>
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<td>59</td>
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<td>Will</td>
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<td>22,714</td>
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<td>McHenry</td>
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<td>18,566</td>
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<tr>
<td>Beaver</td>
<td>60</td>
<td>30,851</td>
</tr>
<tr>
<td>Washington</td>
<td>149</td>
<td>15,830</td>
</tr>
<tr>
<td>Allegheny</td>
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<td>129,296</td>
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<td>Westmoreland</td>
<td>175</td>
<td>37,287</td>
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<tr>
<td>Franklin</td>
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<td>7,545</td>
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<tr>
<td>St. Louis</td>
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</tr>
<tr>
<td>Clinton</td>
<td>--</td>
<td>868</td>
</tr>
<tr>
<td>Madison</td>
<td>173</td>
<td>22,787</td>
</tr>
</tbody>
</table>

massive losses in manufacturing employment (Table 7.9). These shifts in employment indicate that service centers concentrated in the centers of steel supply are beginning to expand their market areas to serve manufacturers in the hinterlands.

7.5 The Steel Service Center Industry In Chicago

The Chicago steel region, one the greatest centers of steel production in the world, remains at the hub of American manufacturing industries. In 1982, three-quarters of all steel supplied to industry in the United States passed through Chicago (Mueller, 1985). Accordingly, Chicago is the hub of steel distribution as well as supply.

Chicago hosts the largest concentration of steel service centers in the country -- an estimated 620 centers in 1977 (U.S. Bureau of the Census, Census of Wholesale Trade, 1977). Further, with a growth of 107 establishments between 1972 and 1977, Chicago had the second greatest gain in service centers of any metropolitan area in the country. In 1982, the concentration of national service center employment in the City was three times as great as the concentration of national manufacturing employment. In fact, the service center industry is three times as concentrated in Chicago as is typical for the country as a whole. In 1977, over 12% of total industry sales were generated in the Chicago area (U.S. Bureau of the Census, Census of Wholesale Trade, 1977).

Industry Trends in the Chicago Area

Despite the great declines in manufacturing employment in the Chicago area, especially in steel production, the steel service center has continued to thrive and grow. Service center employment in the city grew by 7 percent between 1979 and 1982, while employment in all
Table 7.9. Employment Change in Service Center Industry and All Manufacturing in Selected SMSAs, 1977-82.

<table>
<thead>
<tr>
<th>Place</th>
<th>% Change, Service Center Jobs</th>
<th>% Change, Manufacturing Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>+7%</td>
<td>-18%</td>
</tr>
<tr>
<td>Cleveland</td>
<td>+4%</td>
<td>-17%</td>
</tr>
<tr>
<td>Pittsburgh</td>
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<td>-23%</td>
</tr>
<tr>
<td>Detroit</td>
<td>+12%</td>
<td>-21%</td>
</tr>
<tr>
<td>Davenport-Moline Rock</td>
<td>-8%</td>
<td>-15%</td>
</tr>
<tr>
<td>Indianapolis</td>
<td>-13%</td>
<td>-8%</td>
</tr>
<tr>
<td>Milwaukee</td>
<td>-35%</td>
<td>-9%</td>
</tr>
<tr>
<td>St. Louis</td>
<td>-10%</td>
<td>-6%</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>-19%</td>
<td>-10%</td>
</tr>
<tr>
<td>Nashville-Davidson</td>
<td>+14%</td>
<td>-1%</td>
</tr>
<tr>
<td>Lexington</td>
<td>+78%</td>
<td>-9%</td>
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</table>

manufacturing dropped by 18 percent, and employment in steel making industries plunged by 30 percent.

Imports appear to play a role in the growth of the Chicago steel distribution industry, although lack of definitive data on regional steel consumption precludes a firm statement. Although the share of national imports that pass through the City's port is declining (Table 7.10), the total market volume of steel imports is rising. Thus, Chicago's shrinking portion is of a growing pie. Further, the Chicago port is closed during the winter months when the St. Lawrence Seaway is frozen over. Imported steel products are shipped up the Mississippi by barge and hauled in by truck from ports around the country. Since the deregulation of the trucking industry and improvement of long distance transportation rates, it has been increasingly difficult to pin down regional market penetration of imported steel.

Within the six counties of the Chicago-Gary-Hammond Standard Consolidated Statistical area, the steel distribution industry is clearly centered in Cook County, the heart of the Chicago area. (Table 7.11). Industry growth, however, is occurring in the suburban counties. The regional land use element of the area's general plan cites the suburbanization of manufacturing industries as a major trend continuing to shape and change the physical and social character of the Chicago SCA (Northeastern Illinois Planning Commission, 1984). Although the steel service center industry remains concentrated in Chicago proper, it is clearly following its manufacturing customers out to the suburbs.

This configuration is a result of the split nature of the service center industry in Chicago. There is a strong core of supermarket
Table 7.10. Proportion of Total Steel Imports into the United States by Port of Entry, 1970-1983

<table>
<thead>
<tr>
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<td>San Francisco</td>
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<td>3.1</td>
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<td>Los Angeles</td>
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<td>10.4</td>
<td>10.4</td>
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<td>9.8</td>
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<td>9.8</td>
<td>9.8</td>
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<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
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<td>5.1</td>
<td>5.1</td>
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</table>

Source: American Iron and Steel Institute, Annual Statistical Report.

<table>
<thead>
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<th>County</th>
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<th>1977</th>
<th>Change, 1977-82</th>
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<td>12,737</td>
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</tr>
<tr>
<td>Lake (IN)</td>
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<td>100</td>
<td>+150</td>
</tr>
<tr>
<td>DuPage</td>
<td>1,361</td>
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</tr>
<tr>
<td>Kane</td>
<td>59</td>
<td>NA</td>
<td>---</td>
</tr>
<tr>
<td>Lake (IL)</td>
<td>164</td>
<td>20</td>
<td>+144</td>
</tr>
<tr>
<td>Will</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>McHenry</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

suppliers and specialized suppliers that cater to a national market from warehouses close to the producers and transportation interchanges in Cook County. This core is very old and established: some of the biggest steel service center companies have been in Chicago for 80 to 100 years. Smaller service centers that cater to a local customer base are more impacted by the competitive pressures common to the industry and maybe drawn by the "neighborhood effect" to follow their customers to the urban fringes.

The Chicago Regional Market

The area that Chicago service centers can serve is expanding with the decline in long-distance transportation rates. The Chicago home market area ranges from 125 to 150 miles in radius. The extended market area, regularly served on an overnight delivery basis by the largest steel service centers in Chicago, has a far greater diameter. The Chicago regional market for steel (Figure 7.1) extends from Nebraska and the Dakotas east to Pennsylvania, Maryland and the Carolinas: from Northern Minnesota and the Souix St. Marie to Kentucky. 4

Chicago is unique because it serves as the depot center for many of the largest steel service centers in the country. These vast "supermarket" establishments store diverse inventories of over twenty thousand tons, enough to meet their distribution needs for up to six months (small service centers store two to three months of inventory). From these vast warehouses, steel is supplied to branch plants around the country. The market for the steel service center industry in Chicago is basically national, because of its connection to the branch plants of many companies that range across the United States.
1. Each type of shading represents the market area of the separate service center firms interviewed in the study.

2. Chicago area steel service centers also have extensive national networks through their branch plants.

3. The black area represents the Chicago home market, served by both large and small steel service centers.
Labor Force Characteristics

A greater variety of functions occur in the Chicago service centers than in the industry elsewhere in the nation. Economies of scale are gained from concentration of services, data processing and administration in the headquarters region. Thus, the Chicago steel service center industry is more complex and diverse than elsewhere in the country, and offers more and better employment opportunities than anywhere else.

Almost half the jobs (7,251 or 47 percent) in the Illinois service center industry are clerical or sales positions; another 4,138 or 26.9 percent of the positions are for operatives, laborers and materials movers, and 17 percent are for managerial or professional workers. The average production worker wage in the industry, at about $8.00 per hour, is higher than is typical for the warehousing industry, and is increasing faster than is typical throughout the wholesale trades. This may because of the presence of industrial unions in the sector. Job opportunities in Chicago industry are more diverse because of the number of headquarter plants. Opportunities for administrative, skilled crafts, managerial and professional people in the trade are better in Chicago than elsewhere in the country.

Economic Strategies of Chicago Area Steel Service Centers

The most pressing concern expressed in the course of the interviews with service center representatives was the need to improve profitability after several years of harsh market conditions. Economic strategies of the steel service centers focus on ways to increase return on investment to a level of reasonable profit. Some
are pursuing this by supplying products of a high value added and higher cost; some are increasing service; some are doing both. Corporate and market strategies are described below.

Corporate Strategies

The primary corporate strategy mentioned by industry officials involves boosting return on investment by specializing in higher value-added products and improving services. Some firms are emphasizing a switch to high value added products catering to growth industries such as electronics and instrumentation. This strategy would capture a growth market and increase return on investment through higher profits per shipment. Another strategy is to move product mix into non-steel substitute materials. Officials expect to see manufacturers move to aluminum, ceramics and industrial plastics to reduce weight, increase energy efficiency, and to lower the cost of materials. Some expect to see regional product mix change significantly in this direction by the end of the decade.

Most firms included in this study have moved into or are planning to offer just-in-time delivery services. Even some of the "supermarket" service centers are considering product specialization as part of their strategy of adjusting to large, long-term customer contracts under a just-in-time system. In addition, most are improving their automated data processing functions.

Some service center corporations are striving to increase profitability through vertical integration strategies such as the purchase of manufacturing company or a minimill. Most of the firms interviewed are investing in routine replacement of materials handling and
processing equipment. A minority are expanding through physical expansion of plant and equipment.

Market Strategies

The steel service center industry officials interviewed forecast change in their customer base, their suppliers, and within their own industry in the next decade. They expect demand in Chicago to remain centered around a traditional but much diminished base of agriculture and construction equipment manufacture, machine tools and steel. Growth is expected in computers, communications, electronics, and defense-related aerospace and gas turbine industries.

Demand for rapid delivery, combined with import competition and high transportation costs associated with serving coastal markets, may prevent the Chicago regional market from expanding its perimeters. In addition, decline of local manufacturing is expected to diminish the importance of the local customer base to Chicago steel service centers. If Midwestern steel suppliers are driven out of coastal regions by imports, the existing regional market will be the most important area for the Chicago steel service center industry. If domestic steel producers start to meet market demand, however the Chicago industry may expand beyond regional boundaries to serve a national market.

Outlook for the Chicago Steel Market

All steel service center executives interviewed in the course of the study expect steel in Chicago to survive, but in a greatly reduced form. The shakeout among steel makers is expected to be over by the end of 1986, with survivors emerging in new and reduced forms. Hard times are forecast for steel producers and steel users, but the steel
service center industry sees itself well positioned for expansion in the future.

Chicago area steel distributors expect to receive and resell between forty and fifty percent of all steel produced in this country in the next decade. The industry leaders in the area are positioning themselves to capture a bigger slice of a shrinking pie. All are investing in data processing equipment, and replacing materials handling and routine processing equipment on schedule. Some are expanding their plant space, and purchasing new processing machinery that will provide the higher quality of finished goods required in new manufacturing technologies. Almost all are preparing themselves for the requirements of new inventory control systems.

Officials emphasize that the changes in the industry, from supplier to customer, will combine to make it harder and more expensive for the small and medium sized steel distributor to stay in business. Increasing consolidation and purchase of independent steel service centers by diversified conglomerates is projected for the steel service center industry in the Chicago area. Subsidiaries of large firms, particularly those backed by trading companies, will be in a better position to offer longer terms of payment, will have more capacity to trade in foreign steel, and may well constitute a competitive element that will hasten consolidation of the industry in Chicago.

7.6 Summary of Chicago's Steel Service Center

Steel service center industry officials in Chicago forecast big changes for the steel industry and all actors connected with the industry over the next decade. High interest rates, a strong American
dollar and foreign competition in raw materials and manufactured goods will combine to shrink both the steel producing and steel using sectors. The steel service center industry, however, is expected to increase its role in the manufacturing chain.

Despite the woes of the steel producers, Chicago continues to be the heart of the domestic steel market. Domestic and foreign sources of steel assure necessary supply. The presence of large, established service center firms help to stabilize pricing and market conditions. Innovative production technologies that increase the importance of the steel distributor are being instituted in manufacturing industries throughout the area. As the mills reduce their marketing efforts, Chicago area service centers are in the right spot at the right time to expand their customer bases. To the extent that manufacturing stays in the Midwest, and in the United States, steel service centers will continue to be the bright spot in the troubled American steel industry.
CHAPTER 8: What's Causing Chicago Area Steel Job Loss?

A common perception among the informed public is that steel is a dying industry. This view has been engendered by press accounts suggesting that basic steel's problems are minimills, imports, declining demand and protectionist measures which backfired, none of which can be reversed. Our analysis suggests that each of these causes is either overstated or at least misconstrued. Other compelling factors have been ignored, some of which are remediable.

In this chapter, we summarize the results of our research by dissecting the causes of Chicago area steel job loss. While the preceding chapters have focused heavily on the regional aspects of steel-related activity, here we treat the international and national dimensions as well. We identify both long- and short-term factors, the latter more amenable to policy response. Three sources of recent job loss are highlighted: new forms of competition, changes in the structure of demand, and restructuring of production.

8.1 Long-Term Causes of Steel Job Loss

As we have noted in passing above, the steel industry has enjoyed a rather unique history in American manufacturing. Many of the industry's contemporary problems are the fruit of past choices. But while some would ascribe all of big steel's problems to its oligopolistic past, two other factors also deserve note in the postwar period. They are the emergence of a new international division of labor and the relative maturity of U.S. steelmaking facilities compared with those in most other parts of the world.
Oligopolistic Legacies

The steel industry enjoyed nearly sixty years of collusive market power, from 1901 when the new U.S. Steel trust controlled 64% of output to the mid-1960s, when competition from imports and minimills began to exceed 10% of the market. During this period, steel companies were preoccupied with market management, maintaining price stability and market share, rather than price competition and product/process innovation. Analysts argue that this had two adverse effects on the competitiveness of the contemporary industry.

First, the insulation of steel leadership resulted in poor choice in capacity additions, particularly in the 1950s. When war-torn European and Japanese companies were experimenting with new technologies like the basic oxygen process in their reconstructed plants, U.S. steel firms chose to add more open hearth furnaces (Adams and Dirlam, 1966; Mueller, 1984:2-5). Adoption of continuous casting was similarly retarded. This lag in technology means that today, U.S. capacity remains less productive than that in Japan (Barnett and Schorsch, 1983:107-68).

Second, the specific devices used to police the market, especially the long-lived Pittsburgh-Plus basing point system, led to intensive clustering of the steel industry around its origins in the Pittsburgh area (including Youngstown). As a result, the steel industry became "overdeveloped" in that region, to the detriment of diversification of the host economy (Chinitz, 1960). At the same time, the industry was "underdeveloped" in other regions, especially the south and the west. During the recent period of heightened competition, this uneven locational pattern has had adverse consequences for both steel-rich and steel-poor regions (Markusen, 1985b, Chapter 8).
Chicago area steel is the one segment of the industry which has suffered least from this oligopolistic legacy. Chicago only belatedly became a major steel-producing center, after its major steel-using manufacturers successfully challenged the basing point system. Its mills have received the bulk of newer investments in state-of-the-art technologies. However, it too bears the costs of poor management performance, particularly on the Chicago side of the state border.

The New International Division of Labor

A second critical cause of longer-term job loss is the evolving specialization of countries in international trade. For steel, this has meant the invasion of certain home markets by imports, from 3% in the early 1960s to over 25% in 1984, without compensating growth in steel exports. The U.S. is now the world's largest net importer of steel. This is both a natural and artificial phenomenon.

The shift in favor of steel imports is the joint product of innate and constructed comparative advantages.² The natural portion of this shift is the integration of world markets which has resulted from dramatic ocean shipping cost savings in the postwar period (Mueller, 1984:224). This permits the advantages of cheaper land, resources, energy and labor in other countries to be embodied in manufactured exports.³ Concommitantly, the evolution of the multinational corporation and international communications systems permitted the mobility of capital and commodities overseas in greater magnitudes.

But there is also a sense in which the advantage of certain third world countries in steel production is a constructed one. Until the 1970s, for instance, the Brazilian steel industry was entirely oriented
toward domestic production needs and was a cornerstone of that countries' industrialization program. Beginning in the late 1960s, with Viet-Nam era cash at hand, multinational banks and lending institutions turned to countries like Brazil, which had at the time a military dictatorship implementing a repressive labor policy, and offered them loans to build an export-oriented steel and iron ore industry. This represented a major shift from the previous policy of building a diversified indigenous economy.

The new export-orientation of Brazil's steel industry was also forced upon it by the shock of the OPEC oil price increase. Brazil is an energy-poor country. But this in itself shows the vulnerability of pursuing a relatively undiversified development path. Now, Brazil is increasingly dependent upon steel exports to pay off its loans. From 1980 to 1983, Brazilian steel exports grew at a rate of more than 6% per year, while internal demand was falling (Cantor, 1984a:7). If steel prices should plummet, as they have in the recent worldwide recession, then Brazil's debt crisis would deepen.

Ironically, although it has counseled third world countries in development planning for years, the U.S. has no development policy of its own. Yet as its position in capital goods exports deteriorates, its export specialties are increasingly business services, raw and processed materials like grain, timber and coal, and arms. Furthermore, should the suggested specter of a massive shift toward semi-finished steel imports actually occur, within ten years the U.S. might be almost completely dependent upon two or three sources. Since these are debt-ridden third world countries, it seems reasonable to expect
that they would turn to higher steel prices as a means of paying off their debt.

The Aging Process

While each of the above can be ascribed to conscious choices by management and financiers, yet another long-term problem cannot. That is the simple fact that the U.S. steel complex is relatively older than its competitors. The decisions of the 1950s may well have been too conservative with respect to innovation. On the other hand, U.S. steel companies were fortunate to have an intact set of plants to work with. Unlike their competitors, most of whom were building greenfield plants (Mueller, 1984:238), U.S. companies made what were then often economical and rational decisions to add to brownfield plants, to upgrading existing capacity.

The easiest way to conceptualize this is to think about a family car. In any one year, most households cannot purchase a new car. They make do with repairs and maintenance on their aging autos. Their neighbors may buy a car which is less expensive to operate and more efficient in gas consumption. But this household will weigh the expenses of a wholly new auto, and associated car payments, against operating costs of their less efficient car. Eventually, they will buy a new one, but not every year.

The timing of steel investment is similar. It would be wasteful to replace existing capacity every year. It would be prohibitively expensive as well. Many of the cost and productivity comparisons between U.S. steel and its foreign competitors miss this point completely. It seems reasonable to argue that in the present era, it is
the "turn" of the U.S. steel complex to modernize, although clearly greenfield construction is out of the question (Crandall, 1981). Yet the way capital markets are structured in the U.S., it has been increasingly difficult for steel firms to procure capital to finance improvements. This situation is intensified by the absence of an industrial policy, which responds to this type of situation in countries like Japan.

Antidotes for Long-Term Causes

In general, longer-term causes of industry deterioration are harder to counteract than shorter-term ones. However, several observations can be made. First, oligopoly power has been eroding rapidly as minimills and imports enter domestic markets. (These are explored later in this chapter). They are likely to reverse technology lag; indeed, there is substantial evidence to show that in the past few years, great gains have been made in productivity. The distortions caused by poor locations are less easily overcome. However, these are less serious for Chicago than for steelmaking regions from Pittsburgh through Baltimore and Buffalo.

Our analysis of the long-term issues suggests that a major case can be made for a national development policy. The case for free trade has been forcefully articulated. But the adjustment costs and risk premiums associated with increased international specialization have not been carefully calculated. The same assumption that underlies free trade theory, namely that more competitors are better than fewer, would suggest that the world economy would be better off with a large number of internally diversified economies, thereby cutting down on the possibilities for new OPEC-type price cartels.
Regarding the uneven aging issue, the U.S. would do well to emulate most of its industrialized counterparts in creating some type of longer-term, strategic development bank which would compensate for the short-term imperatives of private financial markets. This type of institution would couple its lending policies with a long-term development strategy. In case of an industry like steel, which badly needs an infusion of investment capital to upgrade its capacity, such a bank could help that industry over the hump.

Overall, whether long or shorter term, the causes of steel job loss fall into three basic categories. First, there are the new sources of competition which have eroded the domestic integrated producers' sales. These include competition in steel-using markets, as well as the domestic minimills and steel imports. Together, they account for about one-third of the area's job loss since the late 1970s (see Figure 8.1.)4 Second, the demand for steel has apparently dropped in the past decade. This accounts for an additional third of job loss, according to our estimates. However, the causes of this shortfall have little to do with changing consumer tastes. Finally, despite some recovery in steel production, steel job loss continues, a factor which can only be accounted for by production restructuring—a combination of automation, intensification of work and subcontracting. An additional one-third of area job loss can be attributed to this source. In the following sections, each of these is reviewed, along with an assessment of its future importance.
Figure 8.1 Causes of Chicago Area Steel Job Loss

Job Loss due to New Competition

Minimills
- newer plants outside the region
- lower input costs

Imports
- overvalued dollar
- new low cost mills
- foreign government subsidies

Indirect Imports

Exports and Indirect Exports

Sectoral Shifts
- toward high tech and military hardware
- toward business services
- away from basic industrial plant, infrastructure, social spending

Steel Substitutes
- aluminum
- plastics
- ceramics
- paper

Disintegration
- subcontracting out
- abandonment of certain lines

Intensification
- job combinations
- overtime

Automation
- investment in new production processes
- computerization
- new replacement lines which are highly automated

Job Loss due to Change in Consumption

Job Loss despite Production Gains

Export:;
8.2. New Sources of Competition

Competition in recent years heightened as two new sources of supply captured greater shares of the domestic market: the minimills and international producers. In 1964, these two sources together accounted for less than 10% of the domestic market. By 1984, each claimed around 20% (Mueller, 1985:21).

Domestic Minimills

Minimills now supply 20% of domestic market tonnage, up from 3% in 1960. However, they account for a smaller share of employment and value-added because they produce relatively unsophisticated steel products with simple, although quite modern, equipment. Most new minimills have been built outside the midwestern steel belt, eroding regional market on the periphery. At most, perhaps 10% of area steel job loss might be ascribed to minimill competition.

In our view, the local job loss associated with minimill growth will not be as severe in the future. In the simpler steel products, regional market niches have largely been occupied -- not much additional change is expected in the rebar and related categories. Minimills challenges continue in some product lines, like bar and structuralss, exacerbated by the shift in using industries toward the sunbelt, although the Chicago area could capture some of these facilities. But the biggest question will be the location of a new generation of minimills, using direct reduction and attempting to produce steel sheet, should they prove feasible. The Chicago area has a strong set of locational advantages for this experimental type of mill.
Imports

Imports have captured an increasing share of the domestic market since the late 1950s, accelerating since 1979. In 1984, imports accounted for 26% of apparent domestic demand, up from 15% in 1979 (Table 8.1). Most of this increase occurred in the past year alone. Indeed, in 1980, 1982 and 1983, imports were at lower levels than in 1979. The most recent acceleration in the rate of import penetration is largely a function of the overvalued dollar.

The exchange rate problem has inflicted severe damage on steel and related manufacturing sectors. The dollar appreciated 42% between June 1980 and December 1984 (Fieleke, 1985). In the view of many analysts, it has been approximately 20 to 30% overvalued for a period of at least two years. This means that imported steel can undercut domestic prices by 30% and that steel-using export industries, like machinery, have an increasingly difficult time marketing their output profitably abroad (Mueller, 1984:248). The U.S. does not, like Brazil and other trading countries, compensate affected industries for out-of-line exchange rates (Mueller, 1985:32). Irreversible decisions to close down capacity by profit-squeezed steel companies and steel-using capital goods industries are being made every month.

Even with exchange rate readjustment, however, imports would maintain a significant share of the market, perhaps as much as 18%. Two classes of imports must be distinguished -- those from third world countries, which are composed of simpler products like rod and increasingly, semi-finished steel, and those from Europe and Japan, which compete in the higher value-added lines like sheet and specialty steels. The former account for a growing share of imports (in tons),
Table 8.1. Steel Shipments, Consumption and Imports, U.S., Selected Years (million tons)

<table>
<thead>
<tr>
<th></th>
<th>Apparent Consumption</th>
<th>Domestic Shipments</th>
<th>Imports</th>
<th>Import Share of Apparent Consumption*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>103</td>
<td>87</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>1975</td>
<td>89</td>
<td>80</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>1979</td>
<td>115</td>
<td>97</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>1981</td>
<td>105</td>
<td>87</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>1983</td>
<td>83</td>
<td>68</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>1984</td>
<td>100</td>
<td>74</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>1985**</td>
<td>97</td>
<td>73</td>
<td>24</td>
<td>25</td>
</tr>
</tbody>
</table>


* Percentage may not add up to 100%, due to the contribution of exports.

** Estimated on the basis of August, 1985 AISI data.
from 4% in 1961 to 15% in 1981, while the shares of Europe and Japan have fallen (Barnett and Schorsch, 1983:48).

Third world steel is competitive both because its mills are generally new and optimally sited, and because its costs of production, particularly labor and environmental costs, are much lower. Third world capacity is growing rapidly, much of it designed to meet the internal demand for steel, which until the past few recessionary years was increasing dramatically. Third world capacity grew from 10 million tons in 1960 to 70 million tons in 1983, and the number of third world producers grew from 19 to 50 (Mueller, 1984:217). While even the best of these mills are not generally more efficient than U.S. mills -- they use more labor per ton -- they compensate for inefficiency with low costs, lower profit rates and significant government subsidies (Mueller, 1984:244).

Competition from European and Japanese steelmakers is perhaps understated by the tonnage figures cited above. In finished steel products, where third world countries are not yet able to compete, developed countries seem to have been able to produce more efficiently, at least in the case of Japan, and to produce higher quality steels and offer superior consumer services (Mueller, 1985:24; U.S. General Accounting Office, 1981:3-1, 7, 10). Labor cost differentials are also significant in Japanese import penetration, although recent studies suggest that the gap is closing and that other cost differentials, such as savings in materials handling, may be even more important (Steel Panel, 1985:67; Norsworthy and Malmquist, 1983).

Arguments for import protection are largely based on claims of unfair competition. It does appear that the strong commitment to
employment maintenance on the part of most steel exporting nations results in dumping (U.S. International Trade Commission, 1984). Simulations suggest that as many as 12,000 U.S. jobs would be preserved if imports were held to their early 1980s levels, 3640 of them in steel alone, although loss of exports from retaliation and subsequent exchange rate adjustments might override these gains (Cantor, 1984b).

Yet, many industry analysts believe that import problems are overrated. Mueller (1985:41) shows that from 1968 to the early 1980s, there was no appreciable increase in imports except in the pipe market, where domestic steel was caught unprepared for the energy crisis, and in semi-finished steel. This was true until the dollar began its prolonged escalation. Thus the elimination of the bias in exchange rates would be the single biggest remedy for containing imports.

**Indirect Imports**

Often hidden in the figures showing a decline in apparent U.S. steel consumption is the dramatic increase in indirect steel imports -- that amount of steel embodied in the increasingly levels of consumer and capital goods imports into the U.S. which replace domestic manufacturers. According to work done by Bethlehem Steel's research department, indirect imports were more or less balanced by indirect exports (U.S. steel embodied in fabricated exports) through 1980. Recently, under the exchange rate distortions, indirect imports of steel have soared, producing a net deficit of 6 to 7 million tons (Wendt, 1985).

The bulk of this indirectly imported steel is contained in consumer durables and machinery, precisely those industries which we
have shown above to be the mainstays of the midwestern economy.
Specifically, the industries in which steel-intensive imports have been on the rise include autos, auto parts, trucks, motorcycles, railway cars, bicycles, construction equipment, steel containers, fasteners, generators, motors, hand and machine tools, fabricated steel structures, and industrial machinery (U.S. International Trade Commission, 1984:218).

Exports

Competition has emerged indirectly in another way as well. Domestic steel exports have dwindled dramatically in recent years. While exports have never exceeded 10% of domestic production, they did amount to more than 7 million tons in 1970. By 1983, they had declined to 1.2 million tons (American Iron and Steel Institute data). In percentage terms, this is a much greater loss than that on the import side, although in absolute terms it accounts for somewhat less imputed job loss. Data compiled by Armco corporation suggests that this decline in exports accounted for 11% of the loss in U.S. steel mill shipments from 1973 through 1985, while increased imports accounted for 14% (Armco, 1984:2).

The loss of export markets in the past four years is largely a function of the exchange rate. However, exports were declining even before 1980. According to the U.S. Office of Technology Assessment study (1980), the U.S. should be able to claim a larger share of growing international markets in high quality steels. Third world countries are still net steel importers. The steels they import are chiefly those required in the higher performance categories, in which
the U.S. should excel. In this arena in particular, innovation in new product lines might pay off handsomely.

Indirect Exports

Perhaps the most underrated source of depressed steel demand in the midwest is the precipitous decline in steel-using exports from other members of the steel-based complex. The adversities experienced by the machinery industries in particular have resulted in widespread plant closings and movement toward overseas production sites. A recent study of the U.S. trade balance for 1980 to 1984 shows that it worsened in every major commodity category except military-type goods. The greatest deterioration has been in the capital goods industries, whose traditional surplus has declined rapidly since 1981. If these largely midwestern industries had maintained their 1981 share, they would have exported $33 billion in 1984, rather than the $12 billion they did. Nevertheless the midwestern machinery industry remains a large net exporter (Fieleke, 1985:45-7).

We have shown in Chapter 3 how most of these non-military capital goods industries are grounded in the midwest economy and are important consumers of Chicago-area steel. This source of steel job loss has been modest, but is growing. The specter of continued deterioration in major steel-using industries has prompted one major steel company to conclude that "the key to the steel industry's long-run prospects is the preservation of its end use markets" (Armco, 1984:7).

New Competitors: A Summary

The record shows that minimills may account for about 10% of area steel job loss, imports 10%, indirect imports another 5% and the decline in exports, including indirect exports, another 5%. Minimill
competition as a source of job loss was more prominent in the 1970s, while imports made their greatest inroads in the early 1980s. Future causes of domestic job loss will be more heavily concentrated in the deterioration of steel-using capital goods export sectors and in the rise of indirect imports, as well as the potential challenge from semi-finished steel imports. For the Chicago region, the threat from steel imports per se appears to be less significant relatively than the threat from loss of steel-using markets.

Three types of remedies are suggested by the analysis. First, the exchange rate problem must be immediately alleviated if steel-using and steel-producing sectors are to regain profitability. Readjustment may not be enough to stem past losses without some sort of trade adjustment assistance. Second, U.S. steelmakers could innovate in product lines that will recapture some of their lost export markets. Third, the issue of wage and environmental differentials between the U.S. and its third world competitors must be addressed directly. We return to that issue in the next chapter.

8.3. Changes in Steel Consumption

Steel consumption has been highly volatile in the U.S. in the past decade. From a high of 123 million tons in 1973, an unusual year, apparent consumption has declined as low as 72 million tons in 1982. In 1984, as Table 8.1 above shows, it return to 100 million. On the average, apparent consumption was about 110 million tons a year in the 1970s but has declined to about 100 million tons now, a level most analysts expect to hold for some time ("Can Steel Stem," 1985). At least one study argues that this has been the single largest source
of the decline in shipments, at least twice as important as import penetration (Armco, 1984).

However, these figures overstate the decline in consumption in two ways. First, these indicators are measured in terms of steel tonnage. But while the bulk of steel consumed has declined, its value may not have. There has been a steady shift toward higher value-per-ton products, especially in the integrated portion of the industry. Second, greater amounts of steel are now imported in the shape of consumer and producer goods. This steel is omitted from domestic consumption figures. Third, as noted in the previous section, some of what is registered as apparent consumption loss is really the evaporation of demand from steel-intensive exporting industries. For these reasons, it is questionable whether American consumers are actually using less steel, especially when considered in value terms.

Lagging demand is often charted by the decline in steel intensity, the amount of steel in tonnage terms per million dollars of GNP. Since 1970, this ratio has fallen by about one third. But as with apparent consumption data, this measure overestimates the downward adjustment by not taking into account quality improvements that raise the value of steel. For instance, the amount of steel in an auto fell from 1.5 tons to about 1.0 by 1983, but the quality and value of that ton was considerably higher. In our view, at most 30% of the decline in domestic steel employment is associated with changes on the demand side.

New Substitutes for Steel

Among those attempting to explain these changes, it is common to ascribe them to changes in the competitiveness of substitutes such as
aluminum, plastics, cement and glass. In the 1970s, this was indeed the case, especially when the energy crisis hit. By the early 1980s, however, auto producers and other steel users had more or less completed their adjustments to price differentials. The prices of substitutes are if anything expected to rise vis-a-vis steel in the coming years (Cantor, 1984c). Substitution by plastics has already been reversed (Mueller, 1985, personal communication). Although no good data is available in the aggregate, we believe less than 10% of past area job loss can be attributed to this type of demand shortfall.

If plastics and ceramics make a lighter automobile, aluminum a better can, and reinforced concrete a cheaper building material, there is little reason to reverse this trend. However, very little has been done to pioneer new steel products, except in the improvement of coated sheet. Yet a number of manufacturing and construction industries have actually increased their use of steel; the proliferation of metal buildings is one example. Fiber optics, fiberglass, and aluminum have all benefited from concerted product research efforts, chiefly via the military research budget. Parallel investments in steel product improvements could have similar payoffs. Similarly, neglect of basic industry product innovations, in such critical sectors as machine tools and small tractors, have sacrificed their markets to Japanese and other foreign suppliers. Often these successful invasions have adopted American military-oriented research findings to commercial uses. A companion problem appears to be the priority that defense-related industries exercise in the engineering profession. In the U.S., industrial engineering is a less-than-premier profession, whereas in Japan, it is one of the most honored. 

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The Changing Composition of the Economy

Another interpretation of the decline in apparent consumptions attributes it to changing consumer tastes and preferences. An example would be the shift away from steel-intensive appliances (refrigerators, freezers) toward electronic apparatus like computers and video equipment (Barnett and Schorsch, 1983:268). But in our view, the changes in the composition of U.S. output which have most adversely affected steel demand are those associated with the U.S.'s emerging role in the new international division of labor. Dramatic growth has taken place in business services, facilitating the international movement of capital and commodities, and in raw materials for export (grain, oil, coal, timber, cotton).

In addition, the priority placed in recent federal budgets on arms procurement, and the parallel growth of arms sales internationally, has shifted manufacturing activity heavily away from basic industrial goods and toward high tech, military-oriented sectors like TV and Radio communications equipment, missiles, aircraft, and so on, disproportionately located in the sunbelt (see Chapter 3). In 1979, less than 5% of blast furnace output and less than 4% of steel foundry products went directly or indirectly into defense production, while 45% of radio and TV communications equipment, 35% of aircraft, and 24% of engineering instruments were defense-related. 8

The demand for steel derived from these growth sectors is dramatically lower than it would be from an international specialization based on machinery exports and a domestic budget oriented toward infrastructure and social spending. The latter would boost sales of consumer durables and housing which use hefty proportions of steel.
Indeed, the defense-led recovery of early 1984 surprised steelmakers who publicly wondered why it failed to materialize in revived steel sales. These sectoral shifts could account for as much as 25% of steel job loss.

Demand Side Summary

Although a drop in demand has been a past source of job loss, it is not likely to continue in the future. Recent predictions of apparent demand assume that it will grow in the future at a rate of about 0.9% annually, to a level of 117 million tons by the year 2000 (Barnett and Schorsch, 1983:278; Mueller, 1985:20). Major shifts toward substitutes have most likely ended. The major threat from the demand side is the possibility that defense-related manufacturing will continue to displace steel. This is a particularly crucial issue for the Chicago area steel, since its mills will have a difficult time serving the defense hardware-related booms of the southwest and southeast (Mueller, 1985:20, 26-7).

8.4. Production Restructuring

New sources of supply and sluggish demand do appear to have depressed domestic shipments nationally by about 25% since 1979. However, within the Chicago area, steel shipments as a percent of total U.S. shipments have actually increased (see Chapter 3). Area mills are relatively new compared with those elsewhere in the nation. As mills in Youngstown, Buffalo, and Pittsburgh were shuttered, Chicago area mills' market area extended eastward. For this reason, we have concluded that losses to the above two factors are not as severe as in other regions, with the possible exception of the defense boom impacts.
By 1984, production in the area had rebounded to levels not far short of the previous 1979 peak. However, while production resurged, employment did not. Especially from 1981 onward, production gains in the area were not matched by employment gains (U.S. Congressional Budget Office, 1984; Personick, 1983). Job levels in 1984 for the Gary-Hammond portion of the area were only 68% of what they had been in 1979 while production reached 92% of that level (DuBois, 1985a). This discrepancy occurred because industry efforts to restructure the production process are improving performance and profitability but not creating net new jobs. As much as 35% of area steel joblessness currently may be a function of this restructuring, which takes three forms: technological change, intensification, and disintegration.

**Technological Change**

Investment in technological change is a two-edged sword from the point of view of workers. On the one hand, the increases in productivity gained by substituting machines for labor generally result in layoffs, since fewer workers are required to meet a given level of output. On the other hand, the firm's market share may increase, and/or further layoffs be averted by the renewed ability of the plant to compete. Recently in steel, the former effect has been dominant, resulting in net job loss. However, without these investments, some lines and plants may have closed altogether, further exacerbating unemployment. Displacement through automation appears to have been particularly intense in the early 1980s. Nationally, while employment declined at a rate of about 1 to 1.5% per year in the 1970s, it escalated to around 11% per year in the early '80s.
Automation also creates notable shifts in the occupational composition of steel jobs. "Greater use of new technologies will spur job growth in occupations as engineers and computer specialists. Conversely, it will likely lead to employment cutbacks or stagnation among clerical workers and less skilled blue-collar workers" (LeGrande, 1984a:2). A detailed study of the period from 1977 to 1980 shows that blue collar jobs were disappearing at a more rapid rate than white collar jobs. Some white collar categories have increased -- computer specialists rose by 22% in four years, engineers by 5%. Others have declined -- drafting jobs fell by 18% and clerical jobs by 12%.

Among blue collar workers, the biggest declines were in the semi-skilled category -- the number of operatives declined by 15% in the four-year period. The largest gains among blue collar workers were among mechanics, repairers and installers, which grew by 17% (LeGrande, 1984a:3-8). However, since 1980, many of these may have been eliminated due to the increased use of subcontracting.

Some of this job loss was associated with absolute declines in steel production. A more accurate measure of the effect of production restructuring alone can be shown by the per ton gains and losses in occupational mix (Table 8.2). The number of white collar workers required to produce a ton of steel actually rose by 3% over the study period, while blue collar workers declined. Blue collar requirements fell most in the operative and laborer categories, suggesting that

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Workers Per Million Tons of Steel Output</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1977</td>
<td>1980</td>
</tr>
<tr>
<td>Total, all occupations</td>
<td>6,081</td>
<td>6,105</td>
</tr>
<tr>
<td>White-collar workers</td>
<td>1,049</td>
<td>1,080</td>
</tr>
<tr>
<td>Professional, technical and related workers</td>
<td>308</td>
<td>330</td>
</tr>
<tr>
<td>Engineers</td>
<td>94</td>
<td>107</td>
</tr>
<tr>
<td>Engineering and science technicians</td>
<td>79</td>
<td>89</td>
</tr>
<tr>
<td>Technicians, except health, science and</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>engineering technicians</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>Computer specialists</td>
<td>100</td>
<td>98</td>
</tr>
<tr>
<td>All other professional, technical,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and related workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers, officials, and proprietors</td>
<td>174</td>
<td>192</td>
</tr>
<tr>
<td>Sales workers</td>
<td>33</td>
<td>49</td>
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<tr>
<td>Clerical workers</td>
<td>533</td>
<td>509</td>
</tr>
<tr>
<td>Blue-collar workers</td>
<td>4,904</td>
<td>4,892</td>
</tr>
<tr>
<td>Craft and related workers</td>
<td>2,099</td>
<td>2,310</td>
</tr>
<tr>
<td>Construction workers</td>
<td>296</td>
<td>346</td>
</tr>
<tr>
<td>Mechanics, repairers, and installers</td>
<td>434</td>
<td>556</td>
</tr>
<tr>
<td>Metalworking craft workers, except mechanics</td>
<td>329</td>
<td>380</td>
</tr>
<tr>
<td>All other craft workers</td>
<td>1,039</td>
<td>1,027</td>
</tr>
<tr>
<td>Operatives</td>
<td>1,748</td>
<td>1,629</td>
</tr>
<tr>
<td>Assembler occupation</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Metalworking operatives</td>
<td>522</td>
<td>545</td>
</tr>
<tr>
<td>Packing and inspecting operatives</td>
<td>57</td>
<td>36</td>
</tr>
<tr>
<td>Painters, production</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Sawyers, metal</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>Transportation equipment operatives</td>
<td>190</td>
<td>213</td>
</tr>
<tr>
<td>All other operatives</td>
<td>941</td>
<td>806</td>
</tr>
<tr>
<td>Laborers, except farm</td>
<td>1,058</td>
<td>954</td>
</tr>
<tr>
<td>Service workers</td>
<td>128</td>
<td>132</td>
</tr>
</tbody>
</table>

these occupations are bearing the brunt of job loss through technological change.

**Intensification, or Greater Output with Fewer Workers**

A strategy that many steel firms have been pursuing lately, intensification is the reorganization of work rules, job classifications and overtime practices in ways which increase the output produced with the same or fewer workers. Job combinations have been a popular way of reducing underutilized labor time, although union members complain that this practice is often dangerous and inefficient.

Another practice growing in popularity is increased use of overtime with currently employed workers rather than the recall laid-off workers, whose benefits must then be covered. Although unions encourage their members to turn down overtime, many workers feel they must take it because they fear their own jobs are in future jeopardy. Both these factors contribute to net job loss.10

**Disintegration: Subcontracting, Spin-offs, Elimination of Product Lines**

Another source of apparent job loss is the growing tendency for integrated producers to disaggregate the production process. There are several ways in which this occurs. One, whole portions of the production process are abandoned or spun off to outside operators who can apparently run them more profitably. In the case of ore operations, vertical dis-integration has permitted ore prices to be radically restructured. Other examples include the elimination of many marketing activities, yielding these markets segments to steel service centers, and the retirement company-owned trucking fleets in favor of independent truckers.
A second type of disintegration involves the subcontracting out of particular services which were once performed in the plant to firms outside, often staffed by former employees. Examples are janitorial services, mold making, brick relining, machinery maintenance, food services, and even industrial engineering activities (see Chapter 4). In DuBois' study of the northwestern Indiana mills in 1985, he found that subcontracting accounted for 21% of recent job loss (DuBois, 1985a). Other sources have estimated this cause to account for as much as 50% of the decline in manpower requirements per ton (Merrill Lynch 1985:14). 11

Both these types of disintegration do not necessarily eliminate jobs. Employees that were previously classified as manufacturing workers are now registered under the "service" sectors of wholesaling, transportation, business services, and retailing. To the extent that jobs are simply displaced into other sectors statistically, disintegration is not strictly speaking a job loss problem. However, such job restructuring does not generally carry with it concomitant salary levels, benefits and stability of employment. It contributes, therefore, to the erosion of community incomes and security.

Production Restructuring Summary

In the Chicago area, upgrading of facilities appears to have proceeded at a faster pace than elsewhere in the country while fewer plants have been shuttered altogether. This means that job loss in the Chicago area is more apt to be the result of automation and other forms of production restructuring than in other regions, where other supply and demand factors are more prominent. This is truer on the Indiana side of the complex, where restructuring may account for more
than 50% of job loss, whereas on the Chicago side, the closing of the Wisconsin Steel and most of South Works are traceable to increased competition and insufficient demand. However, many instances of job loss in the City of Chicago proper are due to the production restructuring. Every mill of significance has pared down its workforce in this manner.

The job loss costs of technological change suggest that product innovation might be a better investment for Chicago than process innovation. Technological improvements are often much more mobile than product innovations, and can easily be diffused elsewhere. Product innovations, especially if fundamental in nature, tend to reinforce geographical clustering around the source of the innovation. As our work on the Chicago area industrial complex shows, steel operations here are in an ideal position to experiment with product innovations in close association with their steel-using customers.

At the same time, job loss in steel will continue regardless of the measures taken to mitigate adverse demand and supply factors. This portion of steel job loss must be met by the creation of job opportunities in other portions of the economy. The most likely sectors to target for retraining blue collar workers will be those requiring similar skills, particularly the machinery and machine tool industries, whose output could conceivably grow with the new demands for automated machinery. These industries must be encouraged to respond to the challenge posed by European and Japanese invasion of their markets.

In the interim, special assistance will have to be made available to displaced steelworkers. Job creation in related sectors is a
time-consuming and lumpy process. The data presented in Chapter 1 suggest that the physical and emotional destruction of the increasingly chronically unemployed workforce in steel areas is a societal waste which ought not to be tolerated. For steelworkers, the closing of major mills is a kind of natural disaster. Effective transitional support is the answer.

8.5 A Summary of Job Loss Causes

Although perfect information does not exist, our review found that a number of factors affecting Chicago area steel job loss have been overlooked while others are overstated. Among the latter are the rise of substitutes for steel, competition from imports, and worker wage rages. These do affect the market, but not as strongly as the business press has been suggesting. Less well understood are the negative effects on steel consumption of the Reagan budget shift toward military hardware and from the decline in competitiveness of steel-using capital goods industries internationally, the latter largely a function of the prolonged exchange rate problems.

The roles of domestic minimill growth and automation in eliminating Chicago steelworker jobs are fairly straightforward. However, other sources of apparent job loss include the accelerated use of subcontracting by steel companies and the intensification of work through job combinations and increased reliance on overtime. The implications of this analysis are embodied in the recommendations in Chapter 10.
CHAPTER 9: Are Chicago's Energy and Labor Costs Too High?

Chicago, especially on its southeast side, has a number of outstanding locational advantages, reported in Chapter 1. However, several of our interviewees, as well as many popular press accounts, have suggested that steel firms face a disadvantage locally in the energy and labor costs they pay. These issues are quite complex, since the costs to a steel mill are a function both of wage and energy rates and of the efficiency with which they are used in production. In this chapter, we look at the sources and magnitudes of energy and labor cost differentials.

9.1. Are Chicago-Area Energy Costs Too High?

The production of steel is an extremely energy-intensive process. At its peak in 1975, the steel industry consumed nearly five percent of all the energy used in the entire country (U.S. Office of Technology Assessment, 1980). In 1984, steelmakers accounted for only 2.1% of total energy use and 5.6% of industrial use (Jerry Houck, AISI, private communication; U.S. Department of Energy, 1985a).

A wide variety of fuels are used in the steelmaking process. In integrated mills, coal is the main energy input. Metallurgical and other coals power both coke ovens and blast furnaces. Natural gas and petroleum are used mostly in the later stages of steel production -- reheat furnaces, soaking pits and annealing and heat-treating facilities -- though they are also fed into blast furnaces. Purchased electricity drives various machinery. Finally, energy by-products are employed in complex ways, often unique to each mill. For instance, blast furnace gas may heat soaking pits while tar and pitch from the
coke ovens may be used in the basic oxygen furnaces (Energy and Environmental Analyses, Inc., 1983).

Minimills replace coke oven/blast furnace/basic oxygen furnace complexes with electric furnaces which melt scrap. Thus, these smaller mills have a very different energy consumption pattern, with purchased electricity the main input. When the steel industry's energy consumption pattern in 1972 is compared with 1983, the impact of growth of minimills is clear: electricity has become a much larger energy input (Table 9.1).

Not surprisingly, then, energy accounts for much of steel's current production cost. The Battelle Columbus Laboratories estimated that one-fifth of the cost of steel goes to pay for energy (Lownie, 1982). A more detailed analysis by the Office of Technology Assessment found that energy comprised between 25 and 30 percent of the price of steel (U.S. Office of Technology Assessment, 1983). How will the future of Chicago's steel industry be affected by its energy costs?

The competitiveness of the State and City's energy costs are unclear. The best data is compiled by the Department of Energy on a state-wide basis. Illinois' energy costs are actually below average (Table 9.2). The State's energy tax rate, however, is above the mean: in 1982, Illinois was ranked eighth in revenues from state and local energy taxes. Many other steel-producing states, including Pennsylvania, Ohio, Maryland and New York, are also above average. Illinois' image suffers, however, from the fact that several nearby states -- Indiana, Ohio, Michigan and Missouri -- do not tax energy used (Siegel and Testa, 1985).
No comprehensive data exists for cities, making an accurate assessment of Chicago's situation difficult. Natural gas costs seem

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>1972</th>
<th>1984</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>68.8</td>
<td>63.9</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>20.7</td>
<td>25.2</td>
</tr>
<tr>
<td>Petroleum</td>
<td>6.2</td>
<td>3.9</td>
</tr>
<tr>
<td>Purchased Electricity</td>
<td>4.3</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Table 9.2. Illinois Energy Cost Ranking, 1982

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Over 1 Energy Cost Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum</td>
<td>22/51</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>31/51</td>
</tr>
<tr>
<td>Coal</td>
<td>17/51</td>
</tr>
<tr>
<td>Electricity</td>
<td>14/51</td>
</tr>
<tr>
<td>Overall Energy</td>
<td>31/51</td>
</tr>
</tbody>
</table>


Figures include state and local taxes.
to be reasonable. A 1984 gas industry survey of fifteen cities found that Chicago's industrial gas rate (including tax) ranked twelfth (cited in NIPC, 1985). Electricity rates, however, are high. Pacific Gas and Electricity surveyed eighteen SMSAs last year and rated Chicago's industrial electricity costs (without taxes) seventh highest (cited in NIPC, 1985). If the City's substantial electricity tax was added in, Chicago would be situated even higher. As a result, a local steelmaker estimates that the energy used to make a ton of steel costs $109 in Chicago, $104 in a nearby suburb and $101 in northwestern Indiana. This cost disadvantage, they suggest, will widen to $15 per ton by 1988, if Commonwealth Edison's proposed forty percent rate increase goes into effect (private communication).

Another uncertain factor is the impact that Chicago's energy disadvantage will have on steel industry location decisions. Most questionnaire surveys of companies have not found energy costs to be high in the ranking of locational factors.

- Schmenner found energy was 10th out of 17 factors in determining industry location decisions (Schmenner, 1983).

- The Virginia Division of Industrial Development found utility costs was fifteen out of twenty-eight considerations (Siegel and Testa, 1985).

- The Joint Economic Committee's Survey of high technology firms indicated that energy costs were 11th of 14th factors (U.S. Congress, Joint Economic, 1982)

Theoretical economic analyses differ on whether energy will be an increasingly important consideration. A few examples will suffice. Energy price changes have made long-distance transport relatively cheaper and will allow energy-intensive manufacturers to move freely
to the region with the lowest energy rates (Giarratoni and Socher, 1977). Lakshmanan concluded that manufacturers will be hurt by the Midwest's higher energy prices, and that the region will soon be dominated by less energy-intensive firms (Lakshmanan, 1981).

Schmenner dissents from this general view, suggesting that energy will continue to have a small role in future industrial location decisions (Schmenner, 1984).

Thus, considerable ambiguity surrounds the level and significance of Chicago's energy costs. The importance of energy costs in manufacturers location decisions is also unclear. In view of this uncertainty, seeking to abate energy costs may not be the best approach. An alternative approach may succeed in preserving far more of Chicago's steel industry; the encouragement of investment in energy-conserving technology.

The U.S. steel industry has not matched the energy conservation progress of other nations' steelmakers. As early as 1973, American steelmakers were less energy efficient than West Germany and Japan. This gap has apparently widened in recent years. While the U.S. steel industry has cut energy use per ton by only one percent annually between 1972 and 1981, Japan's steelmakers have become about fifteen percent more energy efficient in these years (Lownie, 1982). Furthermore, despite a backlog of energy conserving technologies, the pace of conservation in the U.S. steel industry apparently is slowing ("Steel Losing", 1983).

Analysts have identified a number of energy-conserving steel technologies for research and/or investment. The most promising of these are underline in Table 9.3. Joint ventures, financial packages
Table 9.3. Promising Energy-Conserving Steelmaking Technologies

<table>
<thead>
<tr>
<th>Category</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coke Ovens:</td>
<td>Dry quenching of coke</td>
</tr>
<tr>
<td></td>
<td>Formcoke processes</td>
</tr>
<tr>
<td>Blast furnaces:</td>
<td>Pulverized coal injection</td>
</tr>
<tr>
<td></td>
<td>Top gas turbines</td>
</tr>
<tr>
<td></td>
<td>High pressure blast furnaces</td>
</tr>
<tr>
<td>Primary finishing:</td>
<td>Continuous casting</td>
</tr>
<tr>
<td></td>
<td>Ladle preheating</td>
</tr>
<tr>
<td></td>
<td>Computer management of ingot soaking pits</td>
</tr>
<tr>
<td>Secondary finishing:</td>
<td>Direct rolling</td>
</tr>
<tr>
<td>Heat treating:</td>
<td>Batch electric annealing</td>
</tr>
</tbody>
</table>

and subsidies should all be explored as ways to encourage the study and installation of these technologies. In this way, any negative impact of Chicago's high energy tax can be counteracted, while the steelmakers' commitment to remaining here is strengthened.

9.2 Are Chicago-Area Steelworkers' Wages Too High?

Labor costs are a prominent concern among financial analysts, academics, and industry spokesmen we interviewed. One steel scholar cites them as one of the four principal causes of domestic steel's lack of competitiveness:

Unduly high employment costs resulting from a combination of high wages and benefits and restrictive work rules (Mueller, 1984:227)

Several management people we interviewed argued that steelworkers had "priced themselves out of the market." Although it is risky to compare labor costs across companies, regions and product mixes (Mueller, 1984:246), domestic labor costs per ton of steel are somewhat higher than for competitors. What accounts for these differences?

Workers' wages are determined by both supply and demand forces. The theory of wage determination in economics suggests that workers' wages will settle at the level of their marginal productivity. On the demand side, employers will offer wages which reward workers for their marginal contribution to the value of output. On the supply side, workers' willingness to accept work under specific conditions, their relative skill levels, and the quality of their work effort shape wage levels. In the case of industries like steel and auto, wages are also shaped by the bilateral monopolies exercised in the industrywide collective bargaining process.
Worker Productivity

Are wages "too high" because productivity is down? The evidence shows clearly that this is not the case. The American Iron and Steel Institute, citing data gathered by Peter Marcus of Paine-Webber, argues that productivity gains have been spectacular in recent years (Table 9.4).

The Institute notes that the 1985 figures compare favorably with those for Japan (7.44), West Germany (9.3), the United Kingdom (9.97) and France (10.78). They attribute the gains to modernization, changes in work rules, and the ability of U.S. firms to lay off workers during recessions. The recorded increase in labor productivity nationally jibes with our findings on the adverse effect of recent automation and subcontracting on employment in the Chicago area.

Have steelworker wages risen faster than productivity? Some companies have cited data that shows workers' wages and benefits rising faster than steel prices over the period 1962 to 1982 (DuBois, 1983:51). However, this comparison does not include the effects of increased productivity, i.e. that fewer workers are needed to produce a ton of steel. A study by two University of Wisconsin economists found that wage costs per ton of steel did not rise as rapidly as the composite price per ton of steel from 1960 to 1980. Furthermore, wage costs per ton of steel began to lag prices dramatically beginning in the early 1970s (Hecker and Lieberthal, 1982). They conclude:

Wage costs account for a minor part of increased steel prices...Hourly wage workers have been unjustly accused of causing most of these price increases.
Since their study, productivity gains have accelerated and nominal wages have actually dropped. Given remarkable improvements in labor
Table 9.4. Labor Productivity Gains in American Steel, 1981-85

<table>
<thead>
<tr>
<th>Year</th>
<th>Man Hours per Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>8.90</td>
</tr>
<tr>
<td>1982</td>
<td>8.64</td>
</tr>
<tr>
<td>1983</td>
<td>7.27</td>
</tr>
<tr>
<td>1984</td>
<td>6.67</td>
</tr>
<tr>
<td>1985, 1st Quarter</td>
<td>6.05</td>
</tr>
<tr>
<td>1985, 2nd Quarter</td>
<td>5.97</td>
</tr>
</tbody>
</table>

Source: David Phelps, American Iron and Steel Institute, phone communication, 1985.
productivity, then, it appears that domestic workers have not driven up wages in excess of productivity gains in recent years.

If domestic productivity has improved so dramatically in recent years, and is now superior to that in competitor countries, why are employment costs per manhour and per ton still so high in the U.S. compared with other countries (Table 9.5)? There are several reasons: exchange rates, white collar costs, non-wage benefits, and the layoff effect.

Exchange Rate Bias

The figures in Table 9.5 are expressed in dollar terms with prevailing exchange rates. At the end of 1978, the Japanese cost of steel production was the world's lowest and the U.S. cost was only slightly higher (about 10 percent) (Steel Panel, 1985:49). Until the late 1970s, when the dollar began its sustained climb, the differential between Japanese and American hourly compensation costs was actually falling rapidly. The Japanese figure rose from 51% of the U.S. figure in 1975 to 61% in 1979. As the dollar appreciated in value, this ratio declined again to approximately 50% by 1983 (Belous, 1984:10). While the yen has been appreciating in recent months, differentials between the U.S., Europe and most developing countries have not yet been adjusted. A recent Congression Research Study noted:

It appears that the primary factor behind the recent growth in the U.S.-foreign wage gap has not been labor market forces. Shifts in foreign exchange rates, including a very strong U.S. dollar, seem to have played the leading role in this process (Belous, 1985).

Elimination of the bias in exchange rates could wipe out a major portion of wage differentials.
Table 9.5. Hourly Compensation and Employment Costs per Ton, Selected Countries, 1983, 1984

<table>
<thead>
<tr>
<th>Country</th>
<th>Hourly Compensation(^a) 1983</th>
<th>Steelmaking Employment Costs/Ton(^b) 1984</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$21.73</td>
<td>$170</td>
</tr>
<tr>
<td>Japan</td>
<td>10.87</td>
<td>88</td>
</tr>
<tr>
<td>Germany</td>
<td>11.25</td>
<td>80</td>
</tr>
<tr>
<td>Korea</td>
<td>2.02</td>
<td>25</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.13</td>
<td>20</td>
</tr>
</tbody>
</table>

Sources:  
\(^b\) Merrill Lynch, Steel Industry Quarterly, 1985:15.
Salaried Employment Costs

Aggregate employment cost/ton figures such as those in column 2 include compensation to white collar workers, both nonunion clerical and managerial personnel. Hourly wages account for only two-thirds of total wages and salaries, and this share has been growing (Rosenberg, 1982). Compensation for top management has risen dramatically in the same period that steelworkers wages have been tightly constrained (Metzgar, 1983).

U.S. managerial salaries appear to be much higher than in other industrialized countries, while the differential for production workers is much lower. Beyond the entry level, U.S. white collar workers receive much more than their counterparts in countries like Japan (Pucik, 1984). In Japan, the average white collar worker with 20 years experience earns 40% more than the average production worker, while in the U.S. she/he earns 120% more. White collar compensation costs have been estimated to account for roughly half of the entire employment cost differential in U.S.-Japanese carmaking (Cole and Yakushiji, 1984:126).

Nor does this gap appear justified by greater contribution to productivity. Evidence, again from the auto industry, suggests that Japanese companies devote greater engineering hours per unit of output, while in all other salaried categories, U.S. producers are top-heavy. It is engineering, in particular, where better designs insure higher quality and greater production worker efficiency (United Auto Workers Research Department, personal communication).

Non-wage Benefits
Employment costs are relatively higher in the U.S. because private employers pay for certain types of benefits which other countries supply through national social programs. Social security and health benefits are one such cost factor, unemployment compensation of various sorts is another. The result is a larger share of non-wage benefits borne by U.S. employers, currently averaging about 75% higher than in other countries (Steel Panel, 1985:55). Compared with major competitors, U.S. steelmaking has a relatively high ratio of additional compensation costs to average hourly earnings -- 51%, compared with 38% in Canada, 20% in Japan, and 40% in Mexico (Belous, 1984:12). 

In addition, in some countries, employers provide "in-kind" benefits which are not computed as compensation costs. For instance, most Japanese companies provide some form of housing subsidy -- either housing, savings and mortgage plans, or a direct subsidy. They also provide subsidies for commuting, meals, uniforms, children, and recreation. Yet these costs are often recorded as simply administrative and maintenance costs, or are not reported at all. Some wage costs (company buses, recreational facilities, resorts, housing) may show up in capital accounts (Cole and Yakushiji, 1984:124).

Direct provision often permits Japanese companies to save greatly on benefit costs. For instance, medical care costs them much less because they emphasize prevention rather than cure, deliver health more efficiently, and pay doctor's salaries which are much lower than in the U.S. As a result, medical costs account for about 34¢ an hour in Japan, but $2.00 to $3.00 per hour in the U.S.
A very large portion of the recorded cost difference lies in the social security and pension contribution by employers (United Auto Workers Research Department, personal communication). These accounted for $2.64 per manhour worked in steel in June, 1984. Here, U.S. workers' standard of living is just simply higher, the product of a social choice made decades ago. In Japan, retired people are relatively poorer and are by and large cared for by their families. Social security and pensions in the U.S. permit retirement mobility and greater options for families in the care of their senior members.

The Layoff Effect

A large and growing portion of employment costs per manhour consist of supplemental employment compensation, insurance and the related costs of laid off steelworkers (DuBois, 1983). This portion of labor costs does not represent wages or benefits received by a particular steelworker, but is the product of dividing the total labor-related costs into the manhours actually worked. Employment cost per hour is inflated by involuntary early retirement and lay-off policies which produce a higher "retired to active" ratio and a higher "lay-off-to-working" ratio than in countries like Japan.

The United States is one of the few countries in the world where redundant employees can simply be put out on the street. In Japan as well as in most European and Third World countries, employers can usually reduce their workforce only gradually, no matter how low the order volume and production may fall in any particular period (Mueller, 1984:106).

When analysts cite an hourly compensation figure of $22.00 per hour, then, this is far above what any individual worker receives.

In recent years, this portion of wage costs has increased dramatically. In 1983, there were 143,000 workers on lay off in steel and
another 22,000 working a short workweek (Belous, 1984:8). Their insurance, supplemental unemployment benefits and workmen's compensation contributions, plus those of retirees, were spread over a smaller number of manhours. Provisions for supplemental unemployment compensation rose from $.12 per manhour in 1980 to $.48 in 1982 and $.56 in 1983. Similarly, insurance costs, which are carried for six months after layoff, rose from $1.46 per manhour in 1980 to $3.32 in 1982, falling back to $2.37 in 1983 (AISI, unpublished data). With the magnitude of layoffs continuing through 1985, these costs have undoubtedly continued to increase the cost per manhour figures.

Uncertainty in Gauging Wage versus Productivity Effects

Because of this layoff effect, the figures cited above overstate U.S. productivity achievements (since manhours are reduced by the layoff effect). Employment cost figures are overstated for the same reason. Labor productivity, of course, is determined in large part by the capital equipment with which workers work. It is difficult to disaggregate total employment cost differentials to productivity and hourly wage costs differentials. One such study showed that at least $15 of the $78 dollar per ton 1976 cost differential between Japanese and U.S. steel was due to productivity rather than wage differences (Mueller, 1985:29). Analysts have suggested that labor productivity differentials, whether associated with work rules or inferior capital equipment, may be a more important problem to surmount than wage differentials (Barnett and Schorsch, 1983:276; Phelps at AISI, 1985).

With respect to developing countries' competitors, large wage differentials are countervailed in most product lines by large differences in productivity. The fact that a third world country pays
lower wages does not necessarily make it more competitive internationally. For instance, India pays much lower wages than either South Korea or Brazil but has not had an impact on the world market. Slab production costs in some mills in Belgium and Holland can match those in Korea or Brazil (personal communication from Hans Mueller, 1985). Even given the simplicity of the product (e.g. semi-finished steel), productivity in developing countries is far behind that of most U.S. mills.

Steelworkers' Compensation Compared to Domestic Manufacturing

The view that steelworkers' wages are too high is often buttressed with evidence that they exceed the average manufacturing wage by a large margin. The peak of such differentials occurred in 1981, when steelworkers' wages were almost 70% above the average. By late 1984, the differential had fallen to less than 50% (Merrill Lynch, 1985:12). In 1982, for instance, hourly earnings in steel were $14.00 per hour versus $8.50 per hour for all manufacturing. Part of this differential is caused by abnormally low U.S. wages, compared with other industrialized countries, in many nonunionized manufacturing industries such as apparel, textiles, and assembly portions of higher tech industries.\(^7\)

The fact that steelworkers receive relatively higher wages than some other groups of workers is attributable in part to the special nature of steel work. Steelworkers are compensated for the fact their work is often heavy, dirty and dangerous, work the graveyard shift, change shifts frequently, work Sundays and overtime, and contribute to funds like supplemental unemployment benefits that allay the risks of involuntary layoffs associated with pronounced cycles in the industry.
These add to base pay. For instance, in June of 1984, the actual production worker wage per manhour worked was $11.14. Incentive pay accounted for an additional $1.40, the shift differential for 17¢, the Sunday premium for 23¢, overtime premium for 60¢, holiday and vacation provisions $1.60, and supplemental unemployment benefits 46¢ (American Iron and Steel Institute, unpublished data).

Undoubtedly, steelworkers' compensation has been higher because like autoworkers, they were able to share in the oligopolistic profit their respective employers long enjoyed. However, only a portion of the differential represents returns to unionization. Furthermore, as competition has heightened since 1979, steelworker wages have fallen dramatically in absolute as well as real terms.

What's Been Happening to Steelworker Wages?

As a result of a 10% cut negotiated in 1982, steelworkers' pay has been declining. Base pay in December 1982 peaked at $11.91 per manhour worked. By December 1983, it fell to $10.89. The 1983 contract permits wages to rise to the previous 1982 level by 1986. Meanwhile, inflation has reduced the buying power of this wage. In 1982, real hourly earnings including cost-of-living premiums were $8.40 (in 1977 dollars) approximately what they had been in 1977. But by June of 1985, they had declined to $7.63, a decrease of nearly 10% (DuBois, 1985b). These figures exceed the drop in average hourly earnings for all manufacturing workers in the U.S. from 1978 to 1984, which declined 6.7% compared to 13% for steel. This decline is likely to continue if the recent settlement at Wheeling-Pittsburgh is any indication and if the steel market continues to be beleaguered by adverse exchange rates and recession.
It seems clear that the downward pressure on wages is a major industry strategy for coping with sluggish demand and fierce price competition. At the moment, management appears more preoccupied with rolling back labor costs than with lower material costs or interest rates, or with investments that would improve productivity. This review of the literature suggests that there is no clear evidence that justifies attributing a major share of the industry's current problems to labor costs. A great deal of careful empirical work remains to be done on this subject, particularly in allocating apparent cost differentials to exchange rates versus real costs, and in determining to what extent high employment costs result from laggard productivity or actual differences in wages. To quote a comparable review of studies done for the auto industry:

It is less than clear what the role of many factors in the cost differences may be. The assessment of wage and productivity factors made in these reports have been a source of friction not only between union and management but also between manufacturing and financial managers. This friction can prevent concerted efforts to address the problem, and the lack of clarity may obscure proper remedies. For example, if wages are the major source of the cost difference, is the effort to learn more from the Japanese about management and manufacturing techniques misplaced? If productivity is the major source, then the current emphasis on rolling back wages rates, even temporarily, may be counterproductive since in real wages the Japanese appear to be closing the gap. It may only serve to heighten acrimony in the United States between the union and the companies (Cole and Yakushiji, 1984:129).

Indeed, in our interviews with both labor and management, we found each heavily focused on the wage issue at the expense of other strategies for boosting performance and maintaining employment.

Chicago Area Steel Wages
Wage levels have been listed as a disadvantage in several studies of Chicago's economic prospects. However, whether comparing areawide wages or steelworkers wages alone, sources reviewed show that Chicago's position is as good as or better than the nation's. As a major Chicago bank's chief regional economist pointed out recently,

Wage rate comparisons between states or regions, as they are generally drawn, are not very meaningful. After all, is it really fair to compare average manufacturing wages in North Carolina, where the durable sectors represent only 37% of manufacturing employment with those in Ohio, where durables account for 70% of employment? The relevant question is, "What do I have to pay in a particular market for the skill levels required throughout my production process?" When viewed from this perspective, wage rate differentials are not quite so startling....For example, the average hourly wage in SIC 33 -- primary metals -- in Texas has exceeded that in Wisconsin since at least 1976, and the differential widened from 5 cents an hour that year to 63 cents in 1980 (Klarich, speech to the Steel Service Center Industry, no date).

Klarich expects regional wage rate differentials to narrow in the 1980s, due to tighter labor markets and greater union activity in the sunbelt.

In basic steel, BLS figures show that Chicago has had lower average hourly earnings than any other major steelmaking area. In 1982, when the steelmaking national average was $13.36, metropolitan Chicago steelworkers earned $11.91 compared with $15.11 in Detroit, $13.63 in Youngstown/Warren, $13.49 in Cleveland, $13.03 in Pittsburgh, and $13.19 in Birmingham (Metzgar, 1985:Table 16).

Similar conclusions were reached in the 1982 Rand study for Cleveland. The authors found that some Cleveland industries grew in spite of the fact that their wages were higher than those of their national counterparts. Rand's statistical analysis of data for 84
component industries showed no correlation between wage gaps and employment growth rates or changes in local shares of national employment. They concluded that the role of wage differences in economic development is more complicated than it may have appeared on the surface and that other factors such as labor availability, the entrepreneurial environment, capital infrastructure, and technological competitiveness, may strongly shape development prospects (Kingsley and Gurwitz, 1982:xv).

9.3 A Summary of the Wage and Energy Issues

Our findings on the energy cost issue suggest that they are higher for Chicago area mills than for some competitors. Rising electricity costs currently face Chicago mills, due to the addition of nuclear power plants. A smaller source of the differential is the utility tax. However, a large portion of the international differential is attributable to less efficient methods of energy utilization. In addition, the significance of these cost differentials as locational factors is called into question by the literature on firm location decisions. Our findings suggest that energy-conserving improvements might be more effective and equitable than rate or tax rollbacks.

Our review of the literature on steel wage costs suggests that no solid evidence exists for targeting wages as a major contributor to lack of midwestern steel competitiveness. International and regional comparisons are often overstated because of the exchange rate problem, discrepancies in accounting procedures, differences in managerial and white collar costs and productivity, and the layoff effect. Furthermore, higher employment costs here and a function of inferior
technologies and capital stock, at least with respect to Japan. Nor

do Chicago area wages constitute a disadvantage within the national
market. In sum, wage differentials clearly do exist, but their causes
and magnitudes are not discernible from the existing empirical work on
the industry.

In light of the doubt about the significance of wage costs,
strategies like those classified as "bidding down" in Chapter 2 may
turn out to be ineffectual. They may divert attention from other
routes toward improved performance, such as product innovation,
technology improvement, and better labor relations, including in-
creased reliance on the insights of production workers (Barnett and

Furthermore, a "bidding down" strategy is expensive in economic
development terms because it leads directly to a lowering of living
standards and consequently a smaller multiplier in the local and
metropolitan community. The President's Commission on Industrial
Competitiveness, which released its report early in 1985, took a
strong stand in defending workers' standard of living and directed
attention toward improving the quality of labor, tax reform and a
smaller deficit ("Starting at love-fifteen, 1985). Surely, steel-
workers incomes are not excessive from a social standpoint. What a
steelworker actually receives, including benefits, is around $15 per
hour, much lower than the professional incomes of recent college
graduates in business services and engineering. Given the greater
risk of injury and layoff, and the physical and environmental demands
of the job, this does not appear excessive by societal standards.