

Restructuring and Strategic Alliances among Northeast Asia's Large Steel Firms

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Abstract

In Japan, Korea, and China, many large steel firms aggressively restructured their operations in the last decade. This restructuring was far-reaching with some firms being liquidated, others merging, and strategic alliances being strengthened. Partially as a result of this restructuring, employment in steel firms began to fall rapidly after the early-1990s. The Asian financial crisis also had an especially large impact on Korean firms as domestic demand contracted sharply in 1997 and 1998. There was a surge in exports from these three economies and Taiwan in the late 1990s, and the United States charged numerous steel producers in Northeast Asia and other regions of the world with dumping. This charge was not made in the early-mid 1990s, but this firm-level analysis reveals few differences in firm performance between these periods that would substantiate such charges. Moreover, even after the export surge, Northeast Asia's large firms sold most of their output in local markets and the vast majority of their exports went to other Asian countries, not to North America or Europe. However, the recent mergers and proliferation of strategic alliances among the regions largest steel makers raises potentially important anti-trust questions in addition to providing an interesting case study of industry adjustment.

1. Introduction

This paper examines the performance of the largest steel firms in Northeast Asia (defined here as China, Japan, Korea, and Taiwan) in the 1990s. The primary purpose of the paper is to describe trends in indicators of corporate performance and speculate about the factors behind those trends. In the late 1990s the United States charged numerous steel producers in Northeast Asia and other regions of the world with dumping, a charge that was not made in the early-mid 1990s, and it is thus interesting to see if there are any differences in firm performance that might suggest dumping actually occurred.

Three periods with differing economic and political environments are identified. The first period is 1990-1992, when Japan and other Asian countries were experiencing an economic boom and the beginning of the end to the Japanese boom, and exports were restricted by a U.S.-Japan agreement to limit Japanese exports to the United States and the political fallout of this agreement. The third period starts in 1997, when the Asian financial crisis greatly reduced demand for steel exports from Northeast Asian steel makers and the United States renewed its pursuit of limitations on steel imports amidst the U.S. economic boom in the late 1990s. The second period is an interim one when major export markets, Asian economies and United States, and the even larger domestic markets were generally doing very well. The major exception was Japan, where the collapse of the bubble reduced domestic and import demand after 1992.

The paper proceeds to examine trends firm size and product mix (section 2), profitability, productivity, factor intensities, and labor costs (section 3), exports and export propensities (section 4), and corporate finance (section 5). Then section 6 describes a number of cases illustrating the large corporate restructuring that has been going on among Northeast Asia's steel firms in recent years and section 7 offers some concluding remarks.

2. Size and Product Mix

Table 1 shows two measures of corporate size, sales (turnover) and employment on a

non-consolidated basis, and reveals a number of interesting trends. First, with the possible exception of Taiwan, Northeast Asia's steel industry has been contracting in terms of employment since the mid-1990s. The declines were largest in Japan, where 120,000 steel jobs were lost over the last decade, or about one-third of the average in 1990-1992. China also experienced very large decline in steel employment of over 700,000 jobs or 20 percent of the total compared to the early 1990s. The percentage decline in Korea was similar (16 percent) but the absolute number of jobs lost was much smaller because Korea's steel industry is much smaller than China's or Japan's in terms of employment. Comprehensive annual data for Taiwan are not available but employment actually increased between 1991 and 1996, the years in which comprehensive industrial and commercial surveys were conducted. Annual data from the less comprehensive earnings surveys suggest that employment rose through 1993, remained rather constant in 1994-1995 and 1997-2000, but fell markedly in 1996 and 2001.¹

Second, in Japan sales also declined markedly. When measured in US dollars, sales were 28 percent lower in 2001 than the average in 1990-1992. In marked contrast, the value of sales measured in U.S. dollars increased rapidly through 2000 in Korea and China. Again, it is difficult to get comprehensive statistics for Taiwan but data through 1996 indicate increasing sales there as well, and the sales of the top two firms also trended upwards thereafter. Thus, although Japan's steel industry appears to be in steep decline with both employment and the value of sales falling, the picture in the other three countries is mixed, with employment falling but the value of sales rising as restructuring takes place.

Despite the large declines in Japan, Japan still has the largest steel industry in Northeast Asia in terms of turnover, with sales of US\$113 billion in 2000, compared to US\$45 billion in China, and US\$28 billion in Korea, and probably a somewhat smaller amount in Taiwan (Table 1). A very large portion of these sales is accounted for by Japan's largest five steel companies (Nippon Steel, NKK, Sumitomo Metal Industries, Kobe Steel, and Kawasaki Steel), which had combined sales of US\$48 billion on a non-consolidated basis in 2000, though this figure fell markedly to

¹ Estimates (in thousands) from the less comprehensive earnings surveys were 1991=71.7, 1992=76.0, 1993=80.4, 1994=83.9, 1995=82.7, 1996=81.2, 1997=83.3, 1998=83.5, 1999=82.3, 2000=82.9, and 2001=80.5 (Directorate-General of Budget, Accounting and Statistics 2002).

US\$39 billion in 2001. Altogether, there are 16 steel firms in Japan that had annual sales of US\$1 billion or more for some years in 1990-2001. Three of these firms, Hitachi Metals, Nisshin Steel, and Daido Steel, are of intermediate size with non-consolidated sales of US\$2-3 billion in 2000 and 2001. The other eight firms are much smaller and sales in several of the smaller firms fell below US\$1 billion in recent years. In Korea, there is one very large, formerly state-owned firm, Pohang Steel, with sales of close to US\$10 billion in recent years and four others that had sales of about US\$1-2 billion in recent years.² In Taiwan, the national government still owns two-fifths of the largest firm, China Steel, but this company is relatively small with sales of about US\$3 billion in recent years.³ In Taiwan, there is only one other firm with sales of US\$1 billion or more in recent years and it was very small before the late 1990s. In China, the largest firm, Baosteel Group, was created as the result of a recent merger of Baoshan, Shanghai Steel Plants and Shanghai Meishan, but it is still slightly smaller than Pohang in Korea and the big-5 in Japan. There are three other firms with sales of US\$2-3 billion in recent years and a number of other smaller firms.

One reason Japanese steel industry looks so much larger than corresponding industries in the other three economies is because this compilation is based on firm-level data and several of Japan's steel firms are diversified, engaging in a number of activities other than steel. For example, sales are much larger on a consolidated basis than on a non-consolidated basis, US\$79 billion in 2000 and US\$64 billion in 2001, reflecting the fact that these firms own a number of subsidiaries.⁴ In addition many of these subsidiaries and the core company itself are engaged in activities other than steel production. Comprehensive data comparing steel operations and non-steel operations are only available on a consolidated basis and these data show that steel sales accounted for only about two-fifths of consolidated sales in Kobe Steel, a little under two-thirds of consolidated sales in Sumitomo Metal Industries, and about three-fourths or slightly less of

² Note that a sixth firm, Kang Won Industries, merged with one of the top five, INI Steel, and this was largely responsible for the rise in sales and employment in INI Steel in 2000

³ In Taiwan, the government decreased its ownership share of China Steel from almost 100 percent in 1990 to 40 percent in 2001. In Korea the Ministry of Finance, the Korea Development Bank, and other government-related entities held over one third of Pohang's shares but the government divested these holdings and by 2000 Pohang was a private company.

⁴ See Appendix Table 1c for sales on a consolidated basis in Japanese firms.

consolidated sales in the other three large firms, Nippon Steel, NKK, and Kawasaki Steel.⁵ These ratios were generally larger in the smaller steel firms in this sample, Daido Steel after 1999 and Japan Steel Works being the major exceptions. Moreover, ratios would probably be larger in all firms if they could be compiled on a non-consolidated basis because subsidiaries tend to be concentrated in non-steel activities while the main company tends to be concentrated in steel. Available data for steel firms from Korea and Taiwan on a non-consolidated basis suggest that steel operations account for the vast majority of sales in these companies, often 95 percent or more of total sales. These firms thus appear to be far less diversified and Japanese firms, especially the large ones. Thus, large Japanese firms would not appear as large relative to their smaller Japanese counterparts or their counterparts from Korea and Taiwan if comparisons could be limited to steel operations on a non-consolidated basis.⁶

In addition to the long-term trends identified above, the data appear to reveal two important turning points in this period. First, compared to the 1990-1992 period, sales of steel firms rose markedly in 1993-1996 (Table 1). This mini-boom followed the removal of Japan's voluntary restraints on exports of steel to the United States and it is likely that the removal of these restrictions was one reason for the increase in sales in these years. However, as will be seen below, exports account for a relatively small proportion of sales and exports to the United States account for a small share of exports in most of the firms examined here. Thus, it appears likely that high economic growth in domestic markets was a more important cause of the increased sales in China, Korea, and Taiwan. The economic boom in other Asian economies also benefited steel exporters in Japan, even though the domestic market stagnated after the collapse of the asset market bubble in 1992. Second, sales also stagnated or fell in 1998-1999, following the Asian economic crisis, but rebounded rather strongly in 2000. In this case, both domestic and external demand was adversely by the crisis and the subsequent recovery in 2000.

⁵ See Appendix Table 1c for details.

⁶ For Korean and Taiwanese steel makers see sources cited in Appendix Tables 9a, 9b. There are no data on the structure of sales for Chinese firms.

3. Profitability, Productivity, Factor Intensities, and Labor Costs

The data on profitability in large steel firms further underscore the importance of cyclical and long-term patterns in the economic environment surrounding these companies (Table 2). In Japan, profit rates tended to be highest in 1990-1992, when domestic demand was still relatively robust, but fell markedly thereafter. In addition, voluntary export restraints probably contributed to relatively high profit rates in the early 1990s, though it is impossible to ascertain how large this contribution was. Since 1993 net profit rates for the industry have been negative on average and operating profit rates have averaged less than 3 percent. In most years, the operating profit rates of the largest 5 integrated steel makers exceeded the industry average. However, in some years the net profit rate was much lower than the operating profit rate, reflecting relatively large negative flows of non-operating income (often interest payments) and/or extraordinary income items. Many of the large negative net profit rates are related to efforts to pay off costs related to large losses incurred on investments made during the late 1980s and early 1990s when profits were high.

In some contrast, operating profit rates tended to be relatively high in Korea and Taiwan and actually tended to increase over the decade in Korea (Table 2). Both operating and net profit rates of Pohang Steel and China Steel were particularly high, reflecting in part the high concentration of these two businesses in their comparatively profitable core activities. The high concentration on core activities may be one positive aspect of these companies' experience as government-owned enterprises in which financial and property investments were often restricted. Nonetheless, given the general perception that state-owned firms tend to be relatively inefficient, it is somewhat paradoxical that these two firms with a history of state-ownership are among the most profitable of steel companies in Northeast Asia. Among the remaining smaller firms there were some large negative net profit rates in a few companies and years, reflecting again large losses in non-operating income and/or extraordinary income. However, for the smaller Korean firms, operating profit rates remained positive throughout the period and rebounded to high levels after the crisis in 2000 and 2001, indicating that the core steel-related businesses of these companies remained rather profitable.

In China, the only available figures appear to refer to a measure similar to net profits and these profit rates fell from relatively high levels through 1996 to very low levels in 1997-1998 and 2000 (Table 2).⁷ Among Chinese firms, profits were relatively high in recent years in Baosteel Group and Taiyuan and relatively low in a number of firms, including Shanghai Meishan, Anshan, Baotou, Benxi, and Maanshan Iron & Steel. Three of these firms, the profitable Baoshan and the less profitable Shanghai Meishan and Maanshan Iron & Steel, have been involved in restructuring efforts as described below.

There are many reasons for changes in profitability over time and one of the more important supply-side causes of variability is the efficiency of the firm. Two partial measures of efficiency, sales per employee (a measure of average labor productivity) and sales per unit of fixed assets (a measure of physical capital productivity) are presented in Table 3.⁸ For all Japanese firms, average labor productivity rose slightly over the period, rising between 1990-1992 and 1993-1996, but then falling back in 1997-1998 before rebounding some in 1999-2000 and then falling again in 2001. This measure of average labor productivity was generally relatively high in the largest 5 firms, and in several of the medium- and smaller-sized Japanese firms (e.g., Nisshin Steel, Yodogawa Steel Works, Nippon Yakin Kogyo, Tokyo Steel Manufacturing and Toyo Kohan). These productivity measures tended to be much lower when measured on a consolidated basis (see Appendix Table 3c), another indicator that the core businesses concentrated in the group's main firm are relatively efficient (and thus rather profitable).

Figures for Korea indicate some large gains in this measure of average labor productivity in recent years. The increase in 1990-2000 was almost double for all Korean firms, but somewhat less for the larger firms listed in Table 3. Increases of sales per employee were also quite rapid for all firms in Taiwan in 1991-1996 and for all firms in China in 1990-2000. In Taiwan,

⁷ Note that the source used does not provide a precise definition of the profit term used and that Chinese accounting practices often differ markedly from accounting practices in other countries. This is especially true in steel where most firms are state-owned and often have access to undocumented sources of public funds.

⁸ It is usually preferable to calculate these measures of average factor productivity with value added, not sales in the numerator, in order to remove the effects of transactions in intermediate goods on the productivity measures. However, in the case of the steel companies the influence of such transactions on productivity rankings may not be large and data on value added are not available for a large number of sample firms.

increases were relatively slow in the large firm, China Steel, but the pattern in China contrasted with increases being relatively large in a number of large firms. In addition, there is a very large gap in average labor productivity between China's large firms and the industry as a whole, a gap that is much larger than in the other three countries. This is partially related to China's relatively low income and labor productivity levels in general; for example for all steel firms in 2000, China's average labor productivity was 24 times lower than in both Korea and Japan at market exchange rates.⁹ A related factor is the general inefficiency of China's steel industry, which stems from a combination of low economic development levels (e.g., poor infrastructure, poorly educated workers) and past mismanagement in the industry's firms and related government agencies. Another factor was excessive fragmentation of the steel industry, which resulted from the policy of self-sufficiency at the regional level during the Cultural Revolution.

In contrast to the increases observed in average labor productivity in some countries, the measure of average physical capital productivity used here, the sales-fixed asset ratio, has generally been stagnant or declining in these countries, the 1999-2000 period in Korea being the major exception (Table 3). In Japan, most of the decline occurred between 1990-1992 and 1993-1996, with average capital productivity remaining largely unchanged thereafter. Notably, this measure of average capital productivity tended to be relatively low in the five largest firms and relatively high in the two of the three mid-size firms (Hitachi Metals and Daido) and one smaller firm, Kurimoto. In Korea and Taiwan as well, the large firms (Pohang and China Steel) have relatively low average capital productivity, indicating an inverse relationship between size and average capital productivity in these samples. Moreover, average capital productivity tended to be lowest in Taiwan and China, indicating a relatively inefficient use of physical capital in these firms. A noted exception in China was the Shanghai Steel Plants, which had unusually high average capital productivity in 1994-1997.

For large Japanese firms it is also possible to compare operating profit rates and sales per employee on a consolidated basis between steel and non-steel operations for most firms (Table 4). In 1993-1996, the number of cases where the operating profit sales ratio in steel was higher than

⁹ Note that this gap would be much smaller if exchange rates based on purchasing power parity were used (e.g., International Centre for the Study of East Asian Development 2002, p. 28)

the firm-wide average (7) was only slightly larger than the number of cases where this measure of profitability was relatively low (6). However, since 1996 there have been far more cases where operating profit rates in steel were higher than for the firm as a whole (9 of 13 in 1997-1998, 10 of 13 in 1999, 11 of 13 in 2000, and 8 of 13 in 2001). Thus, steel-related activities have tended to generate relatively high profits in recent years compared to other operating activities.¹⁰

Comparisons of labor productivity are only possible for 1999-2000 but here again there are many more cases where productivity is relatively high in steel operations (11 of 14 in both 1999 and 2000). Thus, in recent years, Japanese steel firms appear to make a better return on sales and have higher labor productivity in their steel operations than in their non-steel operations.

One reason for the marked increases in average labor productivity combined with reduced or stagnant levels of average capital productivity is the fact that fixed capital intensity has increased rapidly in some of the region's large steel firms, with increases in fixed assets per employee being especially rapid in Korea, Taiwan, and China (Table 5). For example, an equally high level of fixed assets per employee accompanies the unusually high level of sales per employee in Baoshan in 1994-2000. Moreover, in China, Taiwan and Korea, large firms tend to be much more capital intensive than the industry average by this measure. The marked rise in physical capital intensity in three Korean firms, Dongkuk, Dongbu, and Hyundai Hysco is particularly conspicuous as these firms have rapidly expanded capacity from 1997 forward. In contrast, physical capital intensity has remained relatively constant in the larger, semi-state-owned firms, Pohang and China Steel. In Japan there was a sharp increase between 1990-1992 and 1993-1996, but capital intensity has not changed much thereafter.

A final point of interest is trends in compensation per employee (Table 6). Here again there was some increase in Japan between 1990-1992 and 1993-1996 that partially reflect the appreciation of the yen between the two periods. Thereafter, there has been little change in U.S. dollar terms. Trends are rather similar in Korea and in Taiwan to 1996 as wages have increased far less than average labor productivity. The fallout of the Asian economic crisis, which badly affected Korea, and the continued stagnation of the Japanese economy a decade after the asset

¹⁰ Note that this comparison is not precise because the totals for the firm net out intra-firm transactions that are not netted out from the steel division figures.

bubble's collapse, has continued to put downward pressure on wages in the steel and other industries. The modest rises in wages combined with large declines in employment, mean that the wage share of the cost bill has tended to fall, especially in Japan and Korea. Large firms in Korea and Japan do tend to pay relatively high wages compared to the industry average, however. Patterns in China are also similar in that larger firms tend to pay relatively high wages. They differ in that wages in China's steel industry have continued to rise rapidly, reflecting high economic growth in that economy.

4. Exports and Export Propensities

Table 6 shows trends in exports and in ratios of exports to total sales (export propensities). In the case of all Taiwanese firms and China Steel, exports are proxied with foreign sales, the difference between foreign sales and exports being that both exports and the overseas sales of foreign affiliates are included in foreign sales.¹¹ However, foreign affiliates generally play a relatively small role in the steel industry compared to other industries such as electronics or autos and this is probably especially true in the of Taiwanese firms, including China steel.¹² This is not all of the discrepancy between country steel exports and foreign sales of all steel firms, however. This is because Taiwan's steel exports are compiled on a commodity basis while foreign sales data are compiled from firm-level data and include some exports of non-steel products. Correspondingly, export data for steel firms from other countries include some non-steel exports, and these non-steel exports likely to be relatively large in Japan's large, diversified steel makers.

¹¹ This is one reason that foreign sales could conceivably exceed export sales in comparisons when all Taiwanese firms are compared with Taiwanese exports in Table 6. Another reason is that firm-level data include exports of non-steel products. However, in the Taiwanese case, both of the factors are not very important. First, steel firms are not very diversified (in marked contrast to the Japanese case). Second, foreign affiliates generally play a relatively small role in the steel industry compared to industries such as electric and electric machinery and transportation machinery, primarily because the costs of easily transferable intangible assets such as patents or marketing networks are a relatively small portion of total costs for steel firms, which in turn makes it costly for them to diversify geographically (e.g., Markusen 1991; Plummer and Ramstetter 1991).

¹² Correspondingly differences between foreign sales and exports tend to be relatively small for steel firms compared to firms in other industries.

However, even though these data include non-steel exports and sales of foreign affiliates, foreign sales accounted for a very small, though rapidly rising share of total sales for all Taiwanese firms, 8.9 percent in 1991 and 14.0 percent in 1996. These ratios were much larger in China Steel, but did not rise rapidly until 2001, going from 19 percent or less before 1997 to 23 percent in 2000 and 32 percent in 2001.

In value, Japan's exports of steel increased from US\$13.6 billion in 1990-1992 to US\$15.8-16.0 billion in 1993-1996, 1997-1998, and 2000, but were only US\$14.4 billion or less in 1999 and 2001 (Table 6). The export propensity, measured as the ratio of exports to industry sales, was rather constant in early-mid 1990s at 10-11 percent before 1996 but then rose rapidly to over 14 percent in 1997-1998, 2000, and 2001, partially because domestic demand stagnated and/or fell. Export-sales ratios tended to be much larger in the sample of large firms here. One statistical reason is that some non-steel exports are included in the firm-level estimates as described above. However, it also appears that large Japanese firms are much more dependent on exports than the industry as a whole in Japan. Kawasaki Steel and Japan Steel Works were the most dependent on exports, which accounted for over one third of sales in some years. However, even in these companies, domestic sales accounted for the vast majority of all sales and large Japanese firms generally earned only about one-fifth to one-fourth of their sales from exports.

Korea's export propensities were much larger than Japanese and Taiwanese propensities, but the rose less over time, from 23 percent or less before 1996 to 30 percent in 1997-1998, before falling back to 25-27 percent thereafter. As in Japan and Taiwan export propensities were larger in large firms, rising from 36 percent or less before 1996 to 38 percent in 1997-1998 and 42 percent in 1999. The absolute value of exports also climbed during this period. However, both export values and export propensities fell markedly in 2000 and 2001, the main cause probably being relatively buoyant local demand. The largest firm, Pohang Steel, accounted for the majority of these exports and its export propensity was relatively high, 41-44 percent through 1999, before falling rapidly to 25-26 percent in subsequent years. Thus, Korean firms tend to be the most dependent on exports of the firms examined here, but even these firms sell the majority of their output on the local market. In China, there are no export data for firms but China's overall export

values and export propensities rose rapidly and with export propensities approached Korean levels in 1997-1998 and 2000.

One would be tempted to look at trends in export propensities for indications of dumping. In this respect, the marked increase of these ratios in 1997-1998 in Japan, Korea, and China could be viewed as indications that dumping contributed to unusually large export values in these economies, especially if the products being exported are thought to have a high price elasticity of demand. However, these were crisis years in Asia and two other factors were also important for Korean firms in particular. First, domestic demand collapsed in many Asian countries and this explains slow growth of domestic sales in Korea. Second, the rapid won depreciation led to large increases in export quantities and the value of those exports priced in U.S. dollars. These factors were not that relevant to the Japanese and Chinese cases, where domestic demand remained rather buoyant and currencies were more stable.

Finally, it is important to underscore that other Asian economies, not North America or Europe, are by far the largest export markets for firms that report the direction of exports in recent years. For example, Asia accounted for one-half to two-thirds of all exports for four of the largest five four major steel makers in Japan (Nippon Steel, Sumitomo Metal Industries, Kobe Steel, and Kawasaki Steel) and Pohang in Korea, as well as over 90 percent of China Steel's exports (Table 7). On the other hand, the U.S. market is not a very large export market for most of these companies, and most companies reporting the direction of sales do not even report exports to North America. The major known exception is the second largest Japanese producer NKK, which sent about three-fifths of its exports to North America in 1997-2001. Nonetheless, North America's total share of steel exports was never over 21 percent in any of the four countries during the period studied. Thus, if these firms were dumping in the North American market in the late 1990s, the amounts of exports involved were relatively small, amounting to no more than 6 percent of total sales in Korea (1997-2000), 4 percent in China (2000), 3 percent in Japan (1997-1998), and 1 percent Taiwan (1991 and 1996). On the other hand, Asia was a much more important market with exports to this region accounting for as much as 21 percent of sales in Korea (1997-1998), 19 percent in China (1997-1998), 11 percent in Japanese firms (2001), and 12 percent in Taiwan

(1996).

5. Corporate Finance Structure

Corporate finance is a final topic that has attracted particular attention since the financial difficulties began in Japan in 1991-1992 and in Korea and other Asian economies in 1997. During the booms that preceded these financial difficulties, many firms in a variety of industries made a large number of investments at relatively high cost and had subsequent difficulty servicing related debts. These financial difficulties have been a major reason for the large number of bankruptcies in recent years in Japan and Korea, in particular. In Taiwan and China, financial difficulties have been less pressing to date, but it seems clear that weaknesses in the financial systems and in corporate governance have led similar difficulties in a number of Taiwanese and Chinese firms as well.

One important indicator of the total debt burden in a company is the ratio of total (long-term and current) liabilities to total assets.¹³ Another indicator that highlights the short-term debt burden is the ratio of current liabilities to total assets and Table 7 depicts trends in both of these ratios. In the Japanese steel industry as a whole the total liability-total asset ratio was more or less constant at 70-73 percent while the current liability-total asset ratio fell from 41 percent in 1990-1992 to 35 percent in 1999-2000. Although these ratios are high compared to other countries, there are no sudden changes in the trends observed, suggesting that on average the firms in this industry had little difficulty servicing this debt burden. The sharp increase in the total liability-total asset ratio in Toa prior to its liquidation by its parent (NKK) in fiscal 1998 was a conspicuous exception to this pattern.¹⁴ The total debt burden, and in recent years the short-term debt burden as well, has generally been higher in the largest five companies than in the industry as a whole. The total debt burden in particular has been quite high in four of the largest five firms

¹³ Equivalently one could examine two other common measures, (1) the ratio of equity to total assets or (2) the ratio of total liabilities to equity (also called the debt-equity ratio).

¹⁴ Note that Japanese fiscal years usually begin on 1 April and end on 31 March of the following calendar year.

(all but Nippon Steel) and is probably an important factor spurring consolidation in the industry such as the merger of NKK and Kawasaki Steel into the JFE Group and strengthening of strategic alliances between Nippon Steel, Sumitomo Metals Industries, and Nippon Steel.

In Korea, both of these measures of corporate debt were much smaller, but they both tended to increase in the mid-1990s and then decrease in the late-1990s after the financial crisis broke. This indicates that Korean steel makers also took on debt at a relatively rapid rate during the boom of the mid-1990s and were subsequently forced to reduce their debt burdens after the crisis. The decline in the short-term debt burden was particularly conspicuous after the crisis. Among sample firms, Pohang Steel has always had relatively low debt burdens and generally reduced them throughout the period studied. However, some of the other firms, notably INI Steel, Dongkuk, and Hyundai Hysco, had higher debt burdens that spiked in the mid-1990s as described above. The rise in the debt burden in Kang Won Industries was also one factor behind its subsequent takeover by INI Steel.

In Taiwan, the only available data pertain to China Steel, which had very low and declining debt burdens during these periods. The data on Chinese firms indicate that long-term debt burdens tended to be somewhat lower than in Korea but that short-term debt burdens were relatively high. One must be careful in comparing absolute levels of these ratios because of large differences in accounting practices in China and the other countries, but it is significant that the debt burdens tended to fall far less in China over this period than in the other countries.

When interpreting data for China's companies, it is important to keep in mind that creative accounting is still rife in China, resulting in potentially biased picture of their financial condition. While the collapse of Enron demonstrated that the problem is not endemic to China alone, the scale of the problem is still quite extensive¹⁵. One common distortion is that current assets are inflated by including in receivables steel products that were given away to customers on credit that will never be paid. Besides, the debt burden of many state enterprises was greatly alleviated in the late 1990s, when the government allowed them to write off huge amounts of long-term debt in exchange for shares, issued and deposited in state-owned asset management

¹⁵ Pomfret (2001) reported that when the Finance Ministry of China did a random check of 276 state-owned enterprises, almost all of them were found to cook their financial statements.

companies. After this debt transfer, many debt-ridden firms did not have to pay interest on their accumulated debt, producing a sudden surge in their profitability, even though there were no substantial improvements in the productive performance of these firms. For these reasons, recent reports about sudden improvements in previously chronically indebted Chinese companies should be taken with a grain of salt.

6. Corporate Restructuring and Strategic Alliances

The preceding sections illustrate how Northeast Asia's steel firms have come under extreme competitive pressure in recent years, both from each other and from firms in other regions of the world. Partially as a result of the extreme competitive pressure, there has been a large amount of restructuring among large steel firms in Japan, Korea, and China, as well as led to the establishment and strengthening of a number of strategic alliances in among the region's major steel makers. This section reviews the largest of these changes in the corporate landscape. The corporate landscape also changed in Taiwan with the rapid growth of Yieh United in recent years.

The largest restructuring efforts to date relate to the merger of two of the five giant Japanese firms, NKK and Kawasaki Steel, into the JFE Group in October 2002. The resulting JFE Group is projected to rival the region's largest firm, Nippon Steel, in terms of both sales and employment. The merger may also have contributed to large consolidations in both NKK and Kawasaki Steel before the merger with combined sales falling 18 percent between 2000 and 2001, while combined employment fell 9 percent. Before this merger was negotiated, NKK also liquidated its large affiliate Toa Steel in fiscal 1998. As noted above, this firm experienced a sharp decline in profitability and a sharp rise in debt before its liquidation. In 2001, similar large declines in sales and employment (20 percent and 8 percent, respectively) were observed in major rival Nippon Steel, while Sumitomo Metal Industries experienced also an even larger decline in sales (22 percent) and a much larger decline in employment (also 22 percent). Thus, the merger of NKK and Kawasaki Steel into the JFE Group may be this group's way of facilitating consolidation that is similar to the consolidation going on within other major Japanese steel makers

in important respects.

Recent restructuring in Korean steel industry was prompted by bankruptcies of a number of smaller firms, Hanbo Steel, Sammi Specialty Steel, and Kia Specialty Steel, and INI Steel's takeover of Kang Won Industries in the late 1990s.¹⁶ Although it was a relatively small firm, the collapse of Hanbo Steel hit the Korean economy especially hard because the company was to be the major domestic competitor to Pohang Steel, and the government provided direct and indirect financial support to its ambitious expansion. In the mid-1990s, Hanbo Steel borrowed US\$5.8 billion from the Korean Development Bank and other Korean banks to finance expansion plans. As a result, its already high total liability-total asset ratio skyrocketed from 78 percent in 1992 to 84 percent in 1995 (Asia-Pacific Infoserv, various years b) and 96 percent in 1997 (*Far Eastern Economic Review*, 11 June 1998, p. 66), when the company was forced into bankruptcy.¹⁷ The bankruptcy was one of the first in the Korean financial crises of 1997-1998, and created concerns that the huge bad loan would undermine the financial stability of Korean banks. The government subsequently took over the debts of Hanbo Steel and tried to sell the defunct steel maker with great difficulty. Initially, Pohang Steel was considered a potential buyer, but the deal failed to materialize, and only in the late 2002 Hanbo Steel was purchased by a consortium AK Capital, which is partially financed by the U.S. steel firm Nucor Corporation.

In addition to mergers and consolidation, Japanese steel makers in particular have pursued a number of strategic alliances, many of them with other major steel makers in Northeast Asia. In this respect, Nippon Steel has perhaps been the most active. According to its 2002 annual report, Nippon Steel has four prominent strategic alliances that have been initiated "in response to fluctuations in steel demand and intensifying competition worldwide, and the partners involved aim at benefiting from the joint implementation of collaborative measures".¹⁸ These strategic alliances involve two large Japanese steel makers, Kobe Steel (from December 2001) and Sumitomo Metals Industries (from February 2002), the large Korean steelmaker Pohang Steel

¹⁶ None of these firms ever had sales approaching the US\$1 billion cutoff used in this paper.

¹⁷ The 1997 ratio is calculated from an estimated debt-equity ratio of 22. The loan figure is taken from "Statement of Peter J. Visclosky (D-IN) on the Asian Financial Crisis" (http://www.house.gov/visclosky/t_asia.htm).

¹⁸ See http://www0.nsc.co.jp/shinnihon_english/investor/pdf/2002e.pdf, p. 5.

(from August 2000), and the European Union's largest steel producer Arcel (formerly UNISOR, from January 2001). More specifically, the alliance with Kobe Steel and Sumitomo Metals Industries appear aimed at promoting cost reduction in materials procurement, certain production lines, and distribution. According to its 2001 annual report, the other two alliances appear less well developed when the partners involved were said to be studying possible specific measures.¹⁹ Nonetheless, it is significant that Nippon Steel, the world's third largest steel maker if measured in tonnage, has chosen world's two largest steel makers (Arcel is number 1 and Pohang number 2, see International Iron and Steel Institute 2002) and the two other large Japanese steel makers not that were involved in the JFE merger.

Other Japanese and Korean firms have also pursued an increasing number of strategic alliances in recent years. Of particular interest in this context is Kawasaki Steel's "basic" agreement with Dongkuk Steel in Korea in July 1999 and "comprehensive" agreement with Hyundai Hysco in November 2000.²⁰ Sumitomo Metals Industries' "Medium Term Business Plan" also expresses the intention to expand contracts with Nippon Steel and Kobe Steel and to expand its cooperation with China Steel Corporation, including the initiation of negotiations to form a joint venture with the latter firm.²¹ Still another example was INI Steel's takeover of Kang Won Industries in Korea in March 2000, and subsequent takeover of a smaller company Sammi Steel in December 2000.²²

These trends indicate that two major steel groups may be emerging in Northeast Asia, one centered on the JFE Group and involving Dongkuk Steel and Hyundai Hysco, among others, and the other centered on Nippon Steel, with Pohang Steel, Kawasaki Steel, Sumitomo Metals Industries, and China Steel, among others, participating. This expansion of mergers and strategic alliances can be viewed in at least two perspectives. On the one hand, as documented in this paper, Northeast Asia's large steel firms have come under intense competitive pressure in recent

¹⁹ http://www0.nsc.co.jp/shinnihon_english/investor/pdf/2001e.pdf, p. 4.

²⁰ See http://www.kawasaki-steel.co.jp/e_basic/profile/index_history.html.

²¹ See <http://www.sumitomometals.co.jp/e/pdf/medium-term-business-plan.pdf>, pp. 2-3.

²² Sammi Steel was a smaller Korean steel maker with sales of about \$0.35 billion in 2000. Note that the INI Steel web site calls these mergers, but our understanding is that they were takeovers (http://www.inisteel.co.kr/english/about/about_all.htm).

years and this has forced a large amount of restructuring and consolidation as these firms seek to survive in a more competitive environment. In this respect, these moves may be a natural reaction to tough times and illustrate that there are a variety of ways in which firms can restructure and consolidate. On the other hand, these moves could eventually limit competition in the industry as the larger firms and alliances move to exercise their market power. Thus, these trends will be of interest to policy makers that implement competition and anti-trust policies, as well as to the industry participants themselves.

Steel makers in Taiwan were also actively pursuing a number of strategic alliances, the most prominent of which was the acquisition of Yieh Loong Steel, a manufacturer of hot-rolled and cooled-rolled steel, by China Steel in early 2000. The acquisition allowed China Steel to expand its domestic market shares, to about 84 percent for hot-rolled steel and 68 percent for hot-rolled steel. On the other hand, the market for special steel was increasingly dominated by Yieh United Steel. Although this firm was only created in 1988, it already operates the largest integrated stainless steel plant in South East Asia (Industrial Technology Intelligence Services, 2002).

The recent wave of mergers and acquisitions in China's iron and steel industry was encouraged by government-led campaign to revitalize state-owned enterprises (SOEs) by 'grasping the big, releasing the small' enterprises. By 'grasping the big', the government sought to agglomerate the largest SOEs into larger enterprise groups that could compete on equal footing with rival foreign groups, such as the Japanese *keiretsu* or Korean *chaebol*. The campaign has been implemented particularly vigorously in the iron and steel industry. The Baosteel merger, which resulted after Baoshan Steel effectively bailed out the financially troubled Shanghai Steel Plants and Meishan Iron and Steel (Organisation for Economic Cooperation and Development, 2000, p. 44-45), was perhaps the major result of this policy's implementation in the steel industry. However, the majority of Baosteel's profits are still derived from Baoshan and the merger had not increased profitability in the rest of the firm by 2000 (Table 2). In contrast, the merger of four smaller steel mills in Hunan province into the Hunan Hualing Group resulted in much more successful financial restructuring and substantial cost reductions (Woetzel, 2001). Another noteworthy restructuring project was the split of Magang Iron and Steel into two companies: Maanshan Iron and Steel

Company and Maanshan Magang Holding Company in the mid-1990s. After the split, Maanshan Iron and Steel became responsible for the core steel-producing activity, while Maanshan Magang Holding Company became responsible for dealing with huge debts accumulated by Magang Iron and Steel. This financial restructuring helped make it possible for the shares of Maanshan Iron and Steel to be listed on the Hong Kong and Shanghai stock exchanges. However, a plan to reduce the workforce ran into difficulties, because the company is the biggest industrial enterprise in Anhui Province and the local authorities were concerned that the potentially enormous increase in unemployment would undermine social stability.

7. Conclusions

This paper first examined recent restructuring activity among largest steel firms in Japan, Korea, Taiwan and China in the 1990-2001 period. Many of these firms began serious restructuring by the early- to mid-1990s, and employment fell in most firms after this period, with particularly large declines observed in Japan after the early-1990s and in Korea, and China after the mid-1990s. Taiwanese firms, particularly Yieh United Steel, were exceptions experiencing relatively slow declines in employment and rapid increases in sales were exceptions to these general trends. Profits also fell markedly and remained depressed in Japan while the Asian financial crisis had large effects on the profitability of Korean firms. Throughout the period studied, a crude measure of labor productivity, sales per employee, generally increased, while a similarly crude measure of capital productivity, sales per unit of fixed assets, fell as capital-intensity rose. Despite increases in sales per employee, compensation per employee generally fell after the mid-1990s in Japanese and Korean firms, but continued to increase in China.

By comparing firm performance in the early-mid 1990s and in the late 1990s, the paper tried to find evidence that might substantiate the U.S. Government's charge that Northeast Asian steel producers in were engaged in dumping after the onset of Asian financial crises in 1997-1998. Although there was a surge in exports to North America and other regions during this period, the

firm-level analysis in this paper revealed few differences in firm performance between these periods that would substantiate dumping charges. Moreover, even during this period, Northeast Asia's large firms sold most of their output in local markets and the vast majority of their exports went to other Asian countries, not to North America or Europe. Thus, even if Northeast Asia's firms were dumping in the United States, this dumping accounted for a very small portion of their sales.

The paper concluded discussed several large-scale mergers and strategic alliances among Northeast Asia's large steel makers. These mergers and alliances suggest that two major steel groups may be emerging in Northeast Asia. The first one is centered on the JFE Group, which was created by the merger of NKK and Sumitomo Metals Industries, and involves Dongkuk Steel and Hyundai Hysco, among others. The second group is centered on Nippon Steel and involves Pohang Steel, Kawasaki Steel, Sumitomo Metals Industries, and China Steel, among others. This consolidation may lead to increased concentration and reduced competition in the market-based economies of Japan, Korea, and Taiwan. This raises potentially important anti-trust questions in addition to providing an interesting case study of industry adjustment. A similar consolidation is also going on in China as the government strives to rationalize excess capacity in the state-owned firms that dominate this industry.

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Table 1: Annual Average Sales and Employment, Non-consolidated Accounting

Firm	Sales (US\$billions)						Employment (thousands)					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
All Japanese Firms	135.39	148.55	114.06	119.20	112.75	97.70	370.3	339.9	294.5	277.8	261.3	252.1
Sum of Large Firms	73.39	81.04	63.02	61.86	62.83	50.49	163.1	138.5	110.4	98.5	89.6	81.9
Nippon Steel	19.05	20.56	16.48	16.24	16.73	13.44	37.3	29.5	22.0	19.8	18.9	17.4
NKK	9.79	11.38	8.49	8.88	9.14	7.64	22.7	19.1	15.4	11.7	11.7	10.5
Sumitomo Metal I.	8.58	9.96	7.88	8.15	7.80	6.18	21.2	18.6	14.4	14.5	10.7	8.4
Kobe Steel	9.51	10.66	8.21	7.51	7.39	6.35	20.8	16.6	12.1	10.6	9.8	9.7
Kawasaki Steel	8.73	9.22	7.18	6.87	7.04	5.70	18.1	14.8	11.2	10.4	9.9	9.3
Hitachi Metals	2.49	2.94	2.42	2.73	2.69	1.89	8.3	8.1	7.7	7.3	6.6	6.1
Nisshin Steel	3.16	3.64	2.79	2.80	2.92	2.23	7.6	7.1	5.8	5.0	4.3	4.0
Daido Steel	2.24	2.50	1.97	2.05	2.22	1.63	7.5	6.8	5.8	5.3	4.7	4.4
Yodogawa St. Wk.	1.35	1.37	1.05	1.05	1.00	0.75	2.0	2.0	1.9	1.9	1.8	1.7
Nippon Yakin K.	0.73	0.81	0.62	0.60	0.70	0.56	1.7	1.6	1.3	1.1	1.1	1.0
Kurimoto	1.05	1.44	1.18	1.04	1.10	0.88	3.5	3.3	3.0	2.7	2.6	2.3
Toa Steel Co., Ltd.	1.56	1.32	1.07	na	na	na	1.8	1.7	1.4	na	na	na
Tokyo Steel Mfg.	1.63	1.44	1.17	0.96	1.06	0.73	1.5	1.5	1.3	1.2	1.1	1.1
Aichi Steel	1.33	1.52	1.11	1.10	1.20	0.94	3.4	3.3	3.0	2.9	2.7	2.7
Japan Steel Works	1.25	1.19	1.04	0.97	0.94	0.93	3.7	3.1	2.8	2.6	2.2	2.1
Toyo Kohan	0.94	1.11	0.90	0.90	0.89	0.65	1.9	2.0	2.0	1.5	1.5	1.4
All Korean Firms	17.92	25.07	23.86	23.67	28.23	na	77.3	74.3	66.9	66.5	64.2	na
Sum of Large Firms	11.32	15.00	14.00	13.32	16.55	14.43	35.6	32.2	29.3	26.4	28.2	27.8
Pohang Steel	7.55	9.72	9.08	9.00	10.34	8.59	24.2	21.5	19.4	19.5	19.3	19.2
INI Steel	1.10	1.65	1.49	1.37	2.31	2.23	2.9	3.2	2.9	2.7	4.7	4.6
Kang Won Ind.	0.55	0.83	0.99	na	na	na	2.4	2.4	2.2	na	na	na
Dongkuk	0.82	1.19	1.08	1.20	1.37	1.38	2.7	2.0	1.8	1.6	1.6	1.6
Dongbu	0.95	1.13	0.92	0.99	1.31	1.12	2.4	2.0	1.8	1.3	1.4	1.3
Hyundai Hysco	0.35	0.49	0.44	0.76	1.23	1.11	0.9	1.1	1.3	1.3	1.3	1.1
All Taiwanese Firms	13.22	19.77	na	na	na	na	88.5	91.3	na	na	na	na
Sum of Large Firms	2.26	2.96	3.81	3.66	4.43	na	9.7	9.7	10.6	10.4	10.3	na
China Steel	2.26	2.81	3.17	2.79	3.22	2.52	9.7	9.3	9.1	9.0	8.9	9.0
Yieh United Steel	na	0.31	0.64	0.88	1.21	na	na	1.6	1.4	1.4	1.4	na
All Chinese Firms	27.66	37.69	35.19	na	45.22	na	3,218.2	3,374.7	2,880.5	na	2,515.9	na
Sum of Large Firms	12.12	17.65	16.65	17.55	22.28	na	1,173.3	1,257.5	1,075.8	1,157.9	892.8	na
Baosteel Group	na	na	na	5.46	8.23	na	na	na	na	143.9	154.4	na
Shanghai Steel Pl.	2.35	2.95	2.55	na	na	na	117.7	98.0	90.8	na	na	na
Baoshan	1.58	2.89	3.30	3.43	3.74	na	31.8	33.3	34.3	32.6	14.6	na
Shanghai Meishan	0.22	0.30	0.28	0.43	0.53	na	23.6	25.8	24.7	23.4	20.9	na
Shougang	1.66	2.35	2.25	2.20	2.78	na	201.5	249.6	214.9	206.6	136.0	na
Anshan	2.03	2.55	2.04	2.03	2.49	na	217.8	199.8	176.0	170.7	na	na
Wuhan	1.40	1.90	1.95	1.69	2.13	na	138.2	137.9	117.5	115.9	102.7	na
Panzhuhua	0.47	0.86	1.18	1.23	1.21	na	65.5	103.1	95.8	105.7	80.5	na
Baotou	0.52	0.99	1.03	1.02	1.07	na	79.1	100.6	91.9	90.3	80.3	na
Taiyuan	0.18	0.25	0.28	0.28	0.30	na	67.5	70.6	71.9	76.1	62.1	na
Benxi	0.59	0.97	1.40	0.91	1.21	na	98.6	101.2	90.3	87.7	99.4	na
Maanshan	na	na	na	na	1.08	na	na	na	na	na	69.5	na
Maanshan Magang	na	0.74	na	na	na	na	na	51.8	45.7	na	na	na
Maanshan Ir & St	0.61	0.73	0.88	0.76	na	na	79.4	56.1	35.0	45.0	na	na
Hunan Hualing	na	na	0.82	0.78	0.90	na	na	na	55.2	58.0	54.6	na
Xiangtan	0.21	0.28	na	0.31	0.38	na	25.6	25.2	25.7	25.9	22.3	na
Lianyuan	0.19	0.32	na	0.35	0.37	na	21.0	23.7	22.9	24.6	24.4	na
Hengyang	0.10	0.12	na	0.11	0.12	na	6.0	6.6	6.6	7.4	6.6	na

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Table 2: Mean Operating Profit-Sales and Net Profit-Sales Ratios, Non-consolidated Accounting (percent)

Firm	Operating Profit-Sales Ratios						Net Profit-Sales Ratios					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
All Japanese Firms	6.56	2.53	2.66	2.33	4.29	1.44	2.24	-0.17	-0.90	-1.62	-0.50	-2.44
Nippon Steel	5.78	3.65	6.37	4.95	6.35	1.89	1.86	0.28	0.82	0.01	0.99	-1.67
NKK	5.39	2.95	2.15	4.52	5.81	1.27	1.50	0.29	-1.98	0.34	0.15	-1.94
Sumitomo Metal I.	8.72	5.54	5.80	3.32	7.43	4.19	2.03	-0.81	-0.98	-10.18	0.69	0.13
Kobe Steel	7.92	6.11	5.81	6.40	6.64	3.83	1.67	-0.28	-0.91	-1.81	-7.42	-2.64
Kawasaki Steel	6.63	2.66	4.82	3.85	6.93	2.99	1.83	-0.86	-3.18	0.85	-3.55	-1.50
Hitachi Metals	4.96	2.95	1.39	3.97	2.42	-7.22	2.66	1.87	-0.04	-4.19	1.21	-9.75
Nisshin Steel	6.52	3.64	1.29	4.25	7.21	-4.74	1.14	1.58	0.02	-1.73	0.67	-8.31
Daido Steel	3.06	1.40	0.75	3.68	4.66	0.70	1.64	0.88	-0.08	0.29	1.35	0.42
Yodogawa St. Wk.	7.70	5.87	4.55	0.84	0.99	0.57	3.97	3.59	2.79	1.20	1.00	-3.52
Nippon Yakin K.	6.37	0.90	-5.23	-1.76	3.23	1.25	1.54	-2.08	-6.20	-7.38	-1.28	1.20
Kurimoto	5.56	5.33	3.22	1.07	2.00	-1.79	2.59	2.71	0.70	0.52	0.17	-4.38
Toa Steel Co., Ltd.	11.07	-2.32	-14.81	na	na	na	8.47	-3.13	-18.20	na	na	na
Tokyo Steel Mfg.	20.22	-6.22	-5.85	-7.92	-1.98	-7.03	12.37	-7.01	-7.76	-11.80	-2.90	-6.10
Aichi Steel	3.07	1.45	1.66	4.59	4.78	1.84	1.53	0.64	0.47	2.39	0.38	1.06
Japan Steel Works	6.58	0.56	4.29	2.10	3.31	2.48	5.83	-1.47	0.19	-2.54	-1.94	0.32
Toyo Kohan	5.45	6.82	5.47	4.51	4.86	1.78	2.99	3.13	1.89	2.57	3.30	1.03
All Korean Firms	6.58	8.77	8.99	8.74	10.00	na	1.80	3.24	-0.47	10.60	-5.59	na
Pohang Steel	7.33	14.53	16.96	17.01	17.95	12.89	2.38	6.78	8.79	14.57	14.00	7.39
INI Steel	8.10	4.54	7.63	6.01	9.34	7.46	3.30	1.47	0.19	3.72	2.44	1.19
Kang Won Ind.	7.29	6.17	7.21	na	na	na	2.71	1.44	-2.85	na	na	na
Dongkuk	7.20	5.57	2.62	4.06	3.93	8.67	4.22	3.65	3.96	3.55	-9.69	0.58
Dongbu	4.58	5.42	7.65	6.13	6.25	6.01	1.05	2.11	0.84	2.58	0.24	-0.29
Hyundai Hysco	3.32	3.48	5.77	1.68	8.10	10.38	0.95	-1.50	1.08	-4.77	-5.77	1.13
All Taiwanese Firms	8.25	10.81	na	na	na	na	na	na	na	na	na	na
China Steel	na	19.29	20.61	16.46	21.09	8.69	17.19	10.85	17.32	16.82	18.46	8.77
Yieh United Steel	na	na	na	na	na	na	na	0.21	-3.66	4.61	2.67	na
All Chinese Firms	na	na	na	na	na	na	5.57	6.28	0.33	na	3.06	na
Baosteel Group	na	na	na	na	na	na	na	na	na	3.32	2.27	na
Shanghai Steel Pl.	na	na	na	na	na	na	1.15	2.92	2.11	na	na	na
Baoshan	na	na	na	na	na	na	12.06	18.33	6.03	5.29	9.67	na
Shanghai Meishan	na	na	na	na	na	na	7.40	2.60	2.10	0.08	0.04	na
Shougang	na	na	na	na	na	na	21.81	14.51	1.45	1.38	-0.19	na
Anshan	na	na	na	na	na	na	8.81	6.45	0.48	0.49	0.01	na
Wuhan	na	na	na	na	na	na	12.23	10.34	2.18	2.37	3.44	na
Panzhuhua	na	na	na	na	na	na	3.92	3.05	0.05	0.08	3.45	na
Baotou	na	na	na	na	na	na	4.25	9.84	1.37	0.82	0.06	na
Taiyuan	na	na	na	na	na	na	25.58	26.24	7.08	8.23	4.51	na
Benxi	na	na	na	na	na	na	11.88	9.89	0.61	0.80	0.02	na
Maanshan	na	na	na	na	na	na	na	na	na	na	1.85	na
Maanshan Magang	na	na	na	na	na	na	na	0.80	na	na	na	na
Maanshan Ir & St	na	na	na	na	na	na	6.30	10.61	-0.66	0.21	na	na
Hunan Hualing	na	na	na	na	na	na	na	na	2.08	2.60	3.75	na
Xiangtan	na	na	na	na	na	na	7.62	4.66	na	1.19	1.02	na
Lianyuan	na	na	na	na	na	na	6.87	9.74	na	4.20	0.52	na
Hengyang	na	na	na	na	na	na	7.06	2.05	na	1.71	5.14	na

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Table 3: Mean Sales per Employee and Sales-Fixed Asset Ratios, Non-consolidated Accounting

Firm	Sales per Employee (US\$ thousands)						Sales-Fixed Asset Ratios					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
All Japanese Firms	366	438	386	429	431	388	2.06	1.63	1.58	1.59	1.59	1.52
Nippon Steel	511	709	748	819	884	774	1.93	1.63	1.70	1.41	1.50	1.33
NKK	432	604	550	756	784	731	1.11	1.03	1.08	1.13	1.21	1.18
Sumitomo Metal I.	405	544	551	563	729	738	1.24	1.02	1.00	1.03	1.04	1.08
Kobe Steel	458	656	676	710	752	656	1.50	1.23	1.25	1.07	1.07	1.04
Kawasaki Steel	482	632	638	660	710	614	1.36	1.05	1.13	1.07	1.17	1.12
Hitachi Metals	299	364	315	372	408	308	3.41	3.10	2.83	2.93	3.00	2.60
Nisshin Steel	413	514	480	556	673	561	1.47	1.35	1.28	1.09	1.14	1.05
Daido Steel	298	372	340	388	476	373	2.69	2.17	2.17	2.10	2.34	1.91
Yodogawa St. Wk.	677	671	546	557	563	440	3.60	2.68	2.14	1.99	1.94	2.03
Nippon Yakin K.	422	494	471	542	663	583	1.32	0.95	0.81	0.77	0.64	0.60
Kurimoto	302	435	397	388	426	378	3.69	3.53	2.99	2.28	2.39	2.23
Toa Steel Co., Ltd.	864	764	752	na	na	na	1.94	0.69	0.55	na	na	na
Tokyo Steel Mfg.	1,117	992	916	797	931	688	2.96	1.29	1.33	1.25	1.54	1.33
Aichi Steel	386	455	369	378	436	355	2.13	1.88	1.72	1.68	1.94	1.89
Japan Steel Works	337	385	367	381	432	445	1.81	1.26	1.42	1.26	1.34	1.55
Toyo Kohan	493	560	461	608	604	456	4.52	2.40	1.69	1.53	1.53	1.31
All Korean Firms	235	337	355	356	440	na	2.23	2.02	2.15	2.44	2.56	na
Pohang Steel	312	455	468	462	536	447	0.74	1.07	1.09	1.11	1.27	1.17
INI Steel	379	520	514	507	486	484	2.31	2.99	1.43	1.24	1.03	1.13
Kang Won Ind.	228	324	461	na	na	na	1.88	1.52	1.09	na	na	na
Dongkuk	301	588	589	760	858	866	1.65	1.87	0.84	0.80	0.88	1.04
Dongbu	402	552	514	736	961	847	2.53	2.44	0.78	0.66	0.88	0.95
Hyundai Hysco	371	421	352	585	967	985	2.77	2.37	0.88	0.52	0.88	0.91
All Taiwanese Firms	149	217	na	na	na	na	1.25	1.06	na	na	na	na
China Steel	na	301	376	310	363	280	na	0.71	0.74	0.70	0.85	0.76
Yieh United Steel	na	na	na	624	850	na	na	na	na	na	na	na
All Chinese Firms	8.6	11.2	12.2	na	18.0	na	1.53	1.55	0.94	na	na	na
Baosteel Group	na	na	na	38.0	53.3	na	na	na	na	na	na	na
Shanghai Steel Pl.	20.0	29.9	28.1	na	na	na	na	4.71	3.51	na	na	na
Baoshan	49.5	87.0	96.1	105.5	256.8	na	na	0.40	0.41	na	0.47	na
Shanghai Meishan	9.3	11.7	11.4	18.3	25.4	na	na	1.34	0.95	na	0.56	na
Shougang	8.2	9.4	10.5	10.7	20.5	na	2.42	1.35	0.97	na	0.89	na
Anshan	9.3	12.7	11.6	11.9	na	na	1.00	1.07	0.59	na	0.51	na
Wuhan	10.1	13.8	16.6	14.6	20.8	na	0.89	0.73	0.53	na	0.42	na
Panzhuhua	7.2	8.3	12.3	11.6	15.1	na	0.96	1.02	0.80	na	0.74	na
Baotou	6.6	9.8	11.2	11.2	13.3	na	1.06	1.30	0.78	na	0.49	na
Taiyuan	2.7	3.6	3.9	3.7	4.9	na	0.55	0.56	0.23	na	0.18	na
Benxi	5.9	9.6	15.6	10.4	12.2	na	0.90	1.19	1.56	na	0.63	na
Maanshan	na	na	na	na	15.6	na	na	na	na	na	0.66	na
Maanshan Magang	na	13.9	na	na	na	na	na	0.89	na	na	na	na
Maanshan Ir & St	7.7	14.8	28.1	16.8	na	na	1.48	0.98	0.80	na	na	na
Hunan Hualing	na	na	15.3	13.4	16.4	na	na	na	1.58	na	0.78	na
Xiangtan	8.3	11.1	na	12.1	17.1	na	1.90	1.70	na	na	0.86	na
Lianyuan	9.1	13.5	na	14.0	15.1	na	2.00	2.05	na	na	0.94	na
Hengyang	16.5	17.4	na	14.3	18.4	na	4.14	2.09	na	na	0.46	na

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Table 4: Operating Profit-Sales Ratios and Sales per Employee in Japanese Firms, Consolidated Accounting

Firm	Operating Profit-Sales Ratios (%)						Sales per Employee (US\$ thousands)					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
All Operations												
Nippon Steel	5.93	3.50	4.63	4.49	5.91	2.83	na	na	na	438	476	na
NKK	4.49	3.14	1.86	3.67	4.51	-0.46	325	426	374	382	406	na
Sumitomo Metal I.	7.07	5.09	3.82	0.65	6.05	2.97	440	381	308	326	366	na
Kobe Steel	8.25	6.67	4.66	6.60	7.75	2.96	392	436	380	389	412	na
Kawasaki Steel	6.85	2.32	4.21	3.57	6.03	3.61	395	na	na	367	396	na
Hitachi Metals	4.98	4.17	2.63	4.57	5.29	-2.69	216	209	154	155	182	na
Nisshin Steel	6.86	4.38	1.99	3.62	5.80	-2.63	394	440	379	465	534	na
Daido Steel	3.54	1.94	0.79	3.49	4.89	1.62	307	373	321	300	337	na
Yodogawa St. Wk.	7.74	6.42	4.93	2.24	1.85	1.26	667	614	527	492	467	na
Nippon Yakin K.	5.57	0.59	-2.96	0.17	3.52	1.41	411	447	401	401	457	na
Kurimoto	5.88	5.93	3.24	2.31	2.66	-1.08	305	427	385	380	411	na
Toa Steel Co., Ltd.	9.93	-2.00	-13.86	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	1.66	1.70	4.49	4.29	1.44	na	367	331	310	365	na
Japan Steel Works	6.59	1.01	4.16	2.61	3.86	3.25	264	270	218	235	238	na
Toyo Kohan	6.04	7.17	5.39	4.98	5.33	2.84	450	454	338	364	361	na
Steel Operations only												
Nippon Steel	5.93	2.91	6.01	3.90	5.89	1.28	na	na	na	770	526	na
NKK	na	2.51	2.30	4.59	4.63	-2.72	na	na	na	414	427	na
Sumitomo Metal I.	na	6.63	6.04	2.07	7.43	5.82	na	na	na	481	527	na
Kobe Steel	na	8.15	8.50	8.42	8.58	2.32	na	na	na	443	438	354
Kawasaki Steel	7.42	3.65	6.48	3.65	6.65	3.90	na	na	na	376	410	na
Hitachi Metals	na	3.44	4.28	5.19	5.55	-0.53	na	na	na	214	237	na
Nisshin Steel	na	na	na	na	na	na	na	na	na	417	475	na
Daido Steel	na	1.35	0.60	5.57	5.35	0.77	na	na	na	429	478	343
Yodogawa St. Wk.	na	6.35	4.92	2.28	1.87	1.32	na	na	na	533	531	na
Nippon Yakin K.	na	1.00	-2.69	-0.63	3.94	1.50	na	na	na	388	450	na
Kurimoto	na	8.10	4.35	2.23	3.20	-0.53	na	na	na	403	438	na
Toa Steel Co., Ltd.	na	-2.69	-17.32	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	8.81	4.00	1.22	na	na	na	488	578	na
Japan Steel Works	na	2.80	3.17	2.91	6.84	8.44	na	na	na	188	206	na
Toyo Kohan	na	6.89	5.96	6.28	6.59	3.55	na	na	na	452	447	na

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Table 5: Fixed Assets per Employee and Compensation per Employee, Non-consolidated Accounting

Firm	Fixed Assets per Employee (US\$ thous.)						Compensation per Employee (US\$)					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
All Japanese Firms	180	269	245	270	271	na	41,371	53,614	45,566	47,921	48,379	na
Nippon Steel	266	434	440	579	589	na	56,656	77,158	64,857	na	na	na
NKK	391	585	508	669	709	na	54,208	71,373	63,401	70,655	71,858	na
Sumitomo Metal I.	331	533	548	546	647	683	44,823	59,270	48,820	52,289	na	na
Kobe Steel	312	530	540	665	700	632	48,649	61,911	54,740	61,476	63,826	55,310
Kawasaki Steel	357	610	563	619	606	na	57,083	75,896	61,644	67,394	na	na
Hitachi Metals	88	117	111	127	136	na	48,408	62,086	51,524	57,030	na	na
Nisshin Steel	283	380	376	513	588	na	46,470	62,068	52,900	57,926	na	na
Daido Steel	114	171	157	185	204	na	53,426	69,418	60,965	64,904	na	na
Yodogawa St. Wk.	190	251	254	280	291	na	37,638	47,485	40,520	43,656	na	na
Nippon Yakin K.	323	520	587	702	1,039	na	41,911	53,814	49,008	44,262	na	na
Kurimoto	82	123	133	170	178	na	45,144	61,075	51,598	56,093	na	na
Toa Steel Co., Ltd.	452	1,223	1,373	na	na	na	46,931	62,944	58,524	na	na	na
Tokyo Steel Mfg.	439	781	684	640	603	na	63,301	71,030	59,281	57,098	na	na
Aichi Steel	182	242	214	224	225	na	42,997	53,291	45,358	51,659	na	na
Japan Steel Works	185	309	258	302	322	na	42,382	56,337	48,111	50,400	na	na
Toyo Kohan	112	252	272	397	395	na	41,244	50,513	40,718	61,416	na	na
All Korean Firms	106	162	166	146	172	na	15,370	20,622	17,272	16,128	19,969	na
Pohang Steel	421	426	430	415	424	381	20,546	28,799	22,250	23,066	29,850	na
INI Steel	164	177	359	408	474	429	20,201	28,725	24,712	24,328	26,887	na
Kang Won Ind.	121	228	422	na	na	na	18,463	20,843	20,133	na	na	na
Dongkuk	185	314	716	953	980	830	18,713	23,282	15,976	15,429	18,823	na
Dongbu	159	264	672	1,122	1,096	894	16,853	23,559	12,259	20,822	22,987	na
Hyundai Hysco	140	181	589	1,132	1,104	1,077	19,153	21,620	16,070	18,259	24,271	na
All Taiwanese Firms	120	205	na	na	na	na	15,056	18,863	na	na	na	na
China Steel	na	458	513	441	427	369	na	na	na	na	na	na
All Chinese Firms	5.6	7.5	13.1	na	na	na	651	951	1,168	na	1,401	na
Baosteel Group	na	na	na	55.5	na	na	na	na	na	na	2,684	na
Shanghai Steel Pl.	na	5.8	8.0	na	na	na	na	1,519	1,737	na	na	na
Baoshan	na	205.0	235.6	395.7	547.2	na	na	2,280	3,387	na	5,776	na
Shanghai Meishan	na	7.1	12.0	24.6	45.5	na	na	1,582	2,004	na	2,541	na
Shougang	3.4	7.7	10.8	11.2	23.1	na	687	1,088	1,223	na	1,629	na
Anshan	9.5	12.4	19.5	20.8	na	na	696	1,095	1,277	na	na	na
Wuhan	11.3	19.3	31.3	40.2	49.0	na	762	1,297	1,554	na	1,806	na
Panzhuhua	7.6	8.1	15.4	13.6	20.2	na	666	1,120	1,365	na	1,554	na
Baotou	6.3	8.0	14.5	17.3	27.0	na	579	992	1,158	na	1,175	na
Taiyuan	4.9	7.5	17.7	19.8	27.2	na	690	1,113	1,335	na	1,700	na
Benxi	6.6	8.1	9.9	14.4	19.3	na	710	1,093	1,194	na	1,413	na
Maanshan	na	na	na	na	23.8	na	na	na	na	na	501	na
Maanshan Magang	na	15.6	na	na	na	na	na	1,419	na	na	na	na
Maanshan Ir & St	5.1	16.0	35.0	32.7	na	na	659	1,327	1,499	na	na	na
Hunan Hualing	na	na	9.4	15.4	21.0	na	na	na	1,727	na	1,857	na
Xiangtan	4.4	6.9	na	15.6	19.9	na	707	1,047	na	na	1,568	na
Lianyuan	4.5	6.8	na	10.9	16.1	na	687	1,219	na	na	1,778	na
Hengyang	4.6	8.1	na	27.6	40.2	na	642	914	na	na	1,228	na

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Table 6: Exports and Export-Sales Ratios, Non-consolidated Accounting

Company	Exports (US\$ billions)						Export-Sales Ratios (percent)					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
Japanese Exports	13.61	15.84	15.97	14.18	15.79	14.42	10.05	10.68	14.13	11.89	14.01	14.76
Large Japanese Firms, non-consolidated accounting												
Sum of Large firms	na	15.76	14.70	14.00	na	na	na	19.61	23.40	22.64	na	na
Nippon Steel	4.03	4.62	4.41	3.90	3.83	3.25	21.14	22.48	26.76	24.02	22.87	24.19
NKK	1.86	2.36	2.08	2.24	na	na	19.08	20.79	24.64	25.26	na	na
Sumitomo Metal I.	1.87	2.23	2.15	2.06	na	2.22	21.86	22.44	27.32	25.21	na	36.00
Kobe Steel	1.64	1.92	1.66	1.48	na	na	17.24	18.01	20.29	19.76	na	na
Kawasaki Steel	1.88	2.36	2.32	2.26	2.35	2.22	21.57	25.64	32.38	32.97	33.33	38.94
Hitachi Metals	0.32	0.44	0.41	0.60	0.60	0.35	12.92	14.95	16.91	22.19	22.25	18.69
Nisshin Steel	0.41	0.51	0.46	0.42	na	na	13.00	13.97	16.52	15.11	na	na
Daido Steel	0.17	0.21	0.21	0.21	0.25	0.18	7.74	8.25	10.59	10.22	11.37	11.35
Yodogawa St. Wk.	0.06	0.06	0.06	0.10	na	na	4.08	4.00	5.90	9.06	na	na
Nippon Yakin K.	0.13	0.17	0.14	0.12	na	na	17.55	20.24	21.89	20.04	na	na
Kurimoto	0.04	0.03	0.03	0.02	na	na	3.76	2.30	2.78	1.60	na	na
Toa Steel Co., Ltd.	0.04	0.10	0.08	na	na	na	2.64	7.25	7.21	na	na	na
Tokyo Steel Mfg.	0.10	0.15	0.18	0.06	0.09	na	5.98	10.31	16.32	6.29	8.64	na
Aichi Steel	0.11	0.09	0.08	0.08	na	na	7.95	6.18	6.88	7.04	na	na
Japan Steel Works	0.26	0.36	0.36	0.35	na	na	21.59	30.73	35.46	35.82	na	na
Toyo Kohan	0.04	0.07	0.10	0.10	na	na	4.50	6.36	11.60	10.79	na	na
Korean Exports	4.24	5.26	6.78	6.31	7.19	6.26	22.65	21.49	29.74	26.65	25.48	na
Large Korean Firms, non-consolidated accounting												
Sum of Large firms	4.02	4.90	5.20	5.64	4.70	4.21	35.55	33.09	38.03	42.39	28.40	29.15
Pohang Steel	3.35	4.02	3.87	3.65	2.62	2.23	44.33	41.69	42.94	40.61	25.34	26.00
INI Steel	0.17	0.32	0.39	0.93	0.62	0.57	14.93	19.56	28.35	67.72	26.84	25.70
Kang Won Ind.	0.07	0.10	0.15	na	na	na	12.53	12.36	15.77	na	na	na
Dongkuk	0.09	0.12	0.31	0.46	0.47	0.56	10.94	10.63	30.38	38.08	34.69	40.40
Dongbu	0.24	0.23	0.32	0.36	0.56	0.49	25.53	20.38	37.83	36.22	42.50	43.90
Hyundai Hysco	0.11	0.12	0.16	0.25	0.43	0.35	31.44	25.17	39.78	32.53	35.11	31.60
Taiwanese Exports	1.16	2.17	3.46	4.01	5.20	4.30	8.88	14.04	na	na	na	na
Taiwanese Firms, non-consolidated accounting (foreign sales used instead of exports)												
All Taiwanese Firms	1.09	2.14	na	na	na	na	na	na	na	na	na	na
China Steel	0.43	0.49	0.61	na	0.75	0.82	18.97	17.60	18.00	na	23.25	32.62
Chinese Exports	1.51	3.20	4.57	3.39	5.32	3.97	13.09	19.19	27.37	19.81	24.43	na

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Table 7: Mean Shares of North America and Asia in Total Foreign Sales or Total Exports (percent)

Country or Firm	North America						Asia					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
Shares of Exports from Northeast Asian Countries												
Japan	18.32	12.89	19.77	15.20	13.84	13.38	68.28	76.20	68.21	74.26	77.16	75.30
Korea	17.26	12.45	18.03	20.15	20.82	18.23	74.39	83.03	71.33	68.77	67.13	69.54
Taiwan	14.70	9.77	10.37	14.73	16.36	9.52	72.65	82.34	78.51	77.03	74.62	83.38
China	6.02	9.06	13.14	16.85	17.50	16.29	87.94	80.06	71.20	66.22	68.34	66.38
Shares of Foreign sales in Large Japanese Firms, consolidated accounting												
Nippon Steel	na	na	na	na	na	na	na	na	50.00	64.47	65.87	67.42
NKK	na	na	63.74	58.45	61.70	57.84	na	na	na	na	na	na
Sumitomo Metal I.	na	na	na	na	na	na	na	na	na	56.07	55.71	55.44
Kobe Steel	na	na	na	na	na	na	na	na	48.20	56.00	55.72	52.25
Kawasaki Steel	na	na	na	na	na	na	na	na	na	62.49	64.09	61.97
Shares of Foreign Sales in Pohang Steel, non-consolidated accounting												
Pohang Steel	na	na	na	20.48	12.82	10.74	na	na	na	69.58	76.95	70.40
Shares of Foreign Sales in China Steel, non-consolidated accounting												
China Steel	na	na	na	na	na	na	99.18	99.38	na	na	93.36	95.79

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Table 8: Total Liability-Total Asset and Current Liability-Total Asset Ratios, Non-consolidated Accounting (%)

Firm	Total Liability-Total Asset Ratios						Current Liability-Total Asset Ratios					
	1990-1992	1993-1996	1997-1998	1999	2000	2001	1990-1992	1993-1996	1997-1998	1999	2000	2001
All Japanese Firms	72.82	72.97	72.41	71.70	70.07	72.06	41.40	39.11	36.68	34.94	34.64	na
Nippon Steel	73.23	73.65	73.48	72.29	69.95	71.03	40.40	34.14	31.43	28.56	31.04	34.50
NKK	79.54	78.86	78.31	78.05	78.25	78.83	44.99	39.97	40.45	34.17	31.51	35.89
Sumitomo Metal I.	73.62	75.11	75.36	78.48	77.40	81.23	35.97	37.30	29.77	24.36	27.12	32.90
Kobe Steel	79.04	79.66	77.81	77.82	79.81	79.51	40.63	43.16	41.39	32.57	31.71	35.78
Kawasaki Steel	69.48	72.70	72.55	69.43	68.36	73.34	33.27	27.08	23.60	21.95	25.30	26.64
Hitachi Metals	58.96	56.34	56.04	60.65	58.51	60.52	28.37	25.97	24.60	22.08	32.67	26.54
Nisshin Steel	63.49	60.31	60.29	60.96	57.98	61.07	32.20	36.01	34.52	32.13	31.94	31.81
Daido Steel	72.44	71.10	65.89	64.15	60.22	58.03	38.20	40.92	41.09	36.58	34.98	37.16
Yodogawa St. Wk.	51.75	45.94	30.81	32.50	31.09	24.60	31.99	28.15	22.49	20.28	23.77	19.84
Nippon Yakin K.	69.09	73.67	79.79	83.93	75.19	76.12	40.66	50.06	56.49	67.24	54.15	60.82
Kurimoto	52.12	48.70	44.63	43.78	44.68	44.94	39.51	39.05	33.27	29.76	29.87	32.01
Toa Steel Co., Ltd.	66.40	75.52	85.89	na	na	na	43.98	35.90	38.77	na	na	na
Tokyo Steel Mfg.	39.52	32.98	29.31	24.86	24.89	23.92	27.37	21.31	26.89	20.34	20.36	18.34
Aichi Steel	44.20	44.20	41.19	39.62	39.51	36.48	24.42	21.32	25.10	15.02	19.09	18.67
Japan Steel Works	74.07	69.69	69.13	74.38	73.65	72.64	58.93	48.61	43.48	50.78	45.32	47.99
Toyo Kohan	64.68	62.33	60.66	55.73	53.13	48.51	46.32	36.92	36.90	36.04	37.81	35.90
All Korean Firms	62.75	66.22	69.75	65.91	64.77	na	31.07	37.06	35.88	23.16	27.68	na
Pohang Steel	56.20	55.35	55.84	47.25	46.92	42.12	20.67	23.70	21.60	17.38	19.76	12.79
INI Steel	57.44	65.63	67.53	54.26	65.73	61.41	38.91	50.63	37.69	31.62	35.23	30.49
Kang Won Ind.	59.17	72.07	70.89	na	na	na	30.79	41.74	41.57	na	na	na
Dongkuk	55.79	61.68	74.47	56.88	64.42	59.55	33.48	48.81	41.06	25.76	42.40	43.27
Dongbu	74.44	65.60	73.00	67.84	67.52	67.86	27.56	32.44	34.61	32.44	44.91	42.15
Hyundai Hysco	60.91	71.23	83.60	61.24	61.63	59.88	48.58	56.00	44.89	33.26	37.86	27.08
All Taiwanese Firms	na	na	na	na	na	na	na	na	na	na	na	na
China Steel	na	34.39	36.07	34.50	32.78	31.80	na	22.87	19.75	13.45	14.28	12.87
All Chinese Firms	na	57.17	59.45	na	57.01	na	na	42.47	40.78	na	39.56	na
Baosteel Group	na	na	na	65.79	51.71	na	na	na	na	37.50	35.03	na
Shanghai Steel Pl.	na	67.80	64.73	na	na	na	na	53.92	49.06	na	na	na
Baoshan	na	25.07	34.54	36.41	35.12	na	na	19.04	20.09	17.19	20.11	na
Shanghai Meishan	na	58.41	59.95	84.19	85.57	na	na	55.52	54.35	44.47	52.65	na
Shougang	na	49.11	52.21	49.30	44.65	na	na	32.86	38.89	36.98	37.57	na
Anshan	na	60.17	46.95	51.74	52.25	na	na	49.70	35.16	29.33	33.70	na
Wuhan	na	56.37	56.52	54.00	54.30	na	na	33.69	32.47	33.95	34.31	na
Panzhuhua	na	70.28	69.69	66.56	66.26	na	na	46.34	34.34	33.18	37.17	na
Baotou	na	50.39	56.29	60.54	51.52	na	na	30.09	35.27	38.03	31.93	na
Taiyuan	na	52.33	53.72	55.65	58.15	na	na	42.27	33.76	28.79	32.13	na
Benxi	na	60.25	65.37	64.59	65.64	na	na	40.24	35.32	30.53	33.97	na
Maanshan	na	na	na	na	50.76	na	na	na	na	na	28.42	na
Maanshan Magang	na	32.81	na	na	na	na	na	27.16	na	na	na	na
Maanshan Ir & St	na	30.40	35.50	34.59	na	na	na	22.46	26.31	25.72	na	na
Hunan Hualing	na	na	62.47	57.57	56.13	na	na	na	36.41	37.60	38.16	na
Xiangtan	na	38.85	na	56.27	54.93	na	na	28.14	na	40.33	37.83	na
Lianyuan	na	49.56	na	80.46	54.31	na	na	na	na	49.63	28.47	na
Hengyang	na	83.32	na	85.22	47.94	na	na	na	na	40.85	38.25	na

Note: Data coverage is incomplete for some companies and variables; see Appendix for details and sources.

Appendix A: Time Series Detail, Data Sources, and Data Notes

The purpose of this appendix is to (1) present time series detail underlying the text tables that were omitted from the text to conserve space and (2) detail the sources used when constructing the series used in the text and appendix tables and (3) present data notes that could not be presented in the text tables because of space constraints. First, time series detail is presented in Appendix Tables 1a-8c. Second, Appendix Tables 9a-9b detail the data sources used. Third, this text details notes to the text tables that could not be presented in the tables themselves because of space constraints.

Table 1 (Appendix Tables 1a, 1b, 1c, 1d). Annuals sales were converted to US dollars using average annual exchange rates from International Monetary Fund (2002).

Data omissions for sales: for Toa Steel, 1997-1998 refers to 1997; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for Yieh United Steel, 1993-1996 refers to 1995-1996; for Maanshan Magang, 1993-1996 refers to 1995.

Data omissions for employment: for Toa Steel, 1993-1996 refers to 1993, 1995-1996 and 1997-1998 refers to 1997; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for China Steel 1997-1998 refers to 1997; for Yieh United Steel, 1993-1996 refers to 1996; for all Chinese firms, 1997-1998 refers to 1998; for Shanghai Steel Plants, 1997-1998 refers to 1997; for Maanshan Magang, 1993-1996 refers to 1995-1996 and 1997-1998 refers to 1997; for Hunan Hualing, 1997-1998 refers to 1998; for Xiangtan, 1997-1998 refers to 1998; for Lianyuan, 1997-1998 refers to 1998; for Hengyang, 1997-1998 refers to 1998.

Table 2 (Appendix Tables 2a, 2b, 2c). Operating profits are revenues less operating costs which include intermediate goods and services, labor compensation, and selling and administration costs. Net profits are operating profits less non-operating profits (non-operating income less non-operating expenses), extraordinary items, and taxes.

Data omissions for operating profit-sales ratios: for Toa Steel, 1997-1998 refers to 1997; for all

Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for China Steel, 1993-1996 refers to 1994-1996.

Data omissions for net profit-sales ratios: for Toa Steel, 1997-1998 refers to 1997; for Yeih United Steel, 1993-1996 refers to 1996; for Shanghai Steel Plants, 1997-1998 refers to 1997; for Maanshan Magang, 1993-1996 refers to 1995.

Table 3 (Appendix Tables 3a, 3b, 3c). Fixed assets are as reported in company's balance sheets, and are usually given in their current book values (historical cost). Fixed assets of Chinese firms are valued at current replacement value (historical cost less depreciation). Annual sales per employee were converted to US dollars using annual average exchange rates from International Monetary Fund (2002).

Data omissions for sales per employee ratios: for Toa Steel, 1997-1998 refers to 1997; for Kang Won Industries, 1993-1996 refers to 1993-1995; for Dongbu, 1993-1996 refers to 1993-1995; for Nyundai Hysco, 1993-1996 refers to 1993-1995; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for China Steel, 1997-1998 refers to 1997; for Yeih United, 1993-1996 refers to 1996; for all Chinese firms, 1997-1998 refers to 1998; for Maanshan Magang, 1993-1996 refers to 1995; for Hunan Hualing, 1997-1998 refers to 1998.

Data omissions for sales-fixed asset ratios: for Toa Steel, 1997-1998 refers to 1997; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for China Steel, 1993-1996 refers to 1994-1996; for all Chinese firms, 1997-1998 refers to 1998; for Shanghai Steel Plants, 1993-1996 refers to 1994-1996 and 1997-1998 refers to 1997; for Baoshan, 1993-1996 refers to 1994-1996; for Shanghai Meishan, 1993-1996 refers to 1994-1996; for Maanshan Magang, 1993-1996 refers to 1995.

Table 4 (Appendix Table 4). Operating profits are as defined in notes to Table 2. Annual sales per employee were converted to US dollars using annual average exchange rates from International Monetary Fund (2002).

Data omissions for operating profit-sales ratios: for NKK, 1993-1996 refers to 1993, 1995-1996;

for Sumitomo Metal Industries, 1993-1996 refers to 1993, 1995-1996; for Kobe Steel, 1993-1996 refers to 1993, 1995-1996; for Kawasaki Steel, 1990-1992 refers to 1991-1992; for Hitachi Metals, 1993-1996 refers to 1993 and 1995 and 1997-1998 refers to 1998; for Daido Steel, 1993-1996 refers to 1993, 1995-1996; for Yodogawa Steel Works, 1993-1996 refers to 1993, 1995-1996; for Nippon Yakin Kogyo, 1993-1996 refers to 1993, 1995-1996; for Kurimoto, 1993-1996 refers to 1993, 1995-1996; for Toa Steel Company, 1993-1996 refers to 1993, 1995-1996 and 1997-1998 refers to 1997; for Japan Steel Works, 1993-1996 refers to 1993, 1995-1996; for Toyo Kohan, 1993-1996 refers to 1995-1996.

Table 5 (Appendix Tables 5a, 5b, 5c). Fixed assets are as defined in notes to Table 3. Fixed assets and employee compensation were converted to US dollars using annual average exchange rates from International Monetary Fund (2002).

Data omissions for fixed assets per employee ratios: for Toa Steel, 1993-1996 refers to 1993 and 1995-1996 and 1997-1998 refers to 1997; for all Korean firms, 1993-1996 refers to 1993-1994 and 1996; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for China Steel, 1993-1996 refers to 1994-1996 and 1997-1998 refers to 1997; for all Chinese firms, 1997-1998 refers to 1998; for Shanghai Steel Plants, 1993-1996 refers to 1994-1996 and 1997-1998 refers to 1997; for Baoshan, 1993-1996 refers to 1994-1996; for Shanghai Meishan, 1993-1996 refers to 1994-1996; for Maanshan Magang, 1993-1996 refers to 1995; for Hunan Hualing, 1997-1998 refers to 1998; for Xiangtan, 1997-1998 refers to 1998; for Lianyuan, 1997-1998 refers to 1998; for Hengyang, 1997-1998 refers to 1998.

Data omissions for compensation per employee ratios: for Toa Steel, 1993-1996 refers to 1993 and 1995-1996 and 1997-1998 refers to 1997; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for all Chinese firms, 1997-1998 refers to 1998; for Shanghai Steel Plants, 1997-1998 refers to 1997; for Maanshan Magang, 1993-1996 refers to 1995-1996 and 1997-1998 refers to 1997; for Hunan Hualing, 1997-1998 refers to 1998; for Xiangtan, 1997-1998 refers to 1998; for Lianyuan, 1997-1998 refers to 1998; for Hengyang, 1997-1998 refers to 1998.

Table 6 (Appendix Tables 6a, 6b, 6c): In the case of all Taiwanese firms and China Steel, exports are proxied with foreign sales. The major difference between exports and foreign sales is that the latter include both exports and the overseas sales of foreign affiliates. Exports are converted to US dollars using annual average exchange rates from International Monetary Fund (2002).

Data omissions for exports: for Toa Steel, 1997-1998 refers to 1997; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for China Steel, 1997-1998 refers to 1997.

Data omissions for export-sales ratios: for large Japanese firms, 1993-1996 refers to 1993 and 1995-1996; for Toa Steel, 1997-1998 refers to 1997; for all Taiwanese firms, 1990-1992 refers to 1991 and 1993-1996 refers to 1996; for China Steel, 1997-1998 refers to 1997.

Table 7 (Appendix Table 7). Data omissions: for NKK, 1997-1998 refers to 1998; for China Steel, 1990-1992 refers to 1992 and 1993-1996 refers to 1993 and 1995.

Table 8 (Appendix Tables 8a, 8b, 8c). Total liabilities include long-term and current liabilities.

Total liabilities and equity are equal to total assets.

Data omissions total liability-total asset ratios: for Toa Steel, 1997-1998 refers to 1997; for China Steel, 1993-1996 refers to 1994-1996; ; for all Chinese firms, 1993-1996 refers to 1994-1996 and 1997-1998 refers to 1998; for Shanghai Steel Plants, 1993-1996 refers to 1994-1996 and 1997-1998 refers to 1997; for Baoshan, 1993-1996 refers to 1994-1996; for Shanghai Meishan, 1993-1996 refers to 1994-1996; for Shougang, 1993-1996 refers to 1994-1996; for Anshan, 1993-1996 refers to 1994-1996; for Wuhan, 1993-1996 refers to 1994-1996; for Panzhihua, 1993-1996 refers to 1994-1996; for Baotou, 1993-1996 refers to 1994-1996; for Taiyuan, 1993-1996 refers to 1994-1996; for Benxi, 1993-1996 refers to 1994-1996; for Maanshan Magang, 1993-1996 refers to 1995; for Maanshan Iron and Steel, 1993-1996 refers to 1994-1996; for Hunan Hualing, 1993-1996 refers to 1994-1996; for Xiangtan, 1993-1996 refers to 1994-1996; for Lianyuan, 1993-1996 refers to 1996; for Hengyuan, 1993-1996 refers to 1996.

Data omissions current liability-total asset ratios: for Toa Steel, 1997-1998 refers to 1997; for China Steel, 1993-1996 refers to 1994-1996; ; for all Chinese firms, 1993-1996 refers to

1994-1996 and 1997-1998 refers to 1998; for Shanghai Steel Plants, 1993-1996 refers to 1994-1996 and 1997-1998 refers to 1997; for Baoshan, 1993-1996 refers to 1994-1996; for Shanghai Meishan, 1993-1996 refers to 1994-1996; for Shougang, 1993-1996 refers to 1994-1996; for Anshan, 1993-1996 refers to 1994-1996; for Wuhan, 1993-1996 refers to 1994-1996; for Panzhihua, 1993-1996 refers to 1994-1996; for Baotou, 1993-1996 refers to 1994-1996; for Taiyuan, 1993-1996 refers to 1994-1996; for Benxi, 1993-1996 refers to 1994-1996; for Maanshan Magang, 1993-1996 refers to 1995; for Maanshan Iron and Steel, 1993-1996 refers to 1994-1996; for Hunan Hualing, 1993-1996 refers to 1994-1996; for Xiangtan, 1993-1996 refers to 1994-1996; for Lianyuan, 1993-1996 refers to 1996; for Hengyuan, 1993-1996 refers to 1996.

Appendix Table 1a: Sales, Non-consolidated Accounting (US\$ billions)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	134.12	137.56	134.49	141.68	152.74	163.29	136.50	126.82	101.30	119.20	112.75	97.70
Sum of Large Firms	70.94	74.91	74.31	78.51	82.90	87.00	75.75	69.14	56.90	61.86	62.83	50.49
Nippon Steel	18.46	19.72	18.98	20.02	21.04	21.77	19.40	17.97	14.99	16.24	16.73	13.44
NKK	9.39	9.86	10.12	11.16	11.79	12.03	10.52	9.06	7.92	8.88	9.14	7.64
Sumitomo Metal I.	8.19	8.68	8.88	9.67	10.18	10.96	9.02	8.37	7.39	8.15	7.80	6.18
Kobe Steel	9.35	9.76	9.43	9.90	10.72	11.89	10.14	9.09	7.33	7.51	7.39	6.35
Kawasaki Steel	8.39	9.06	8.75	9.32	9.53	9.63	8.39	7.83	6.53	6.87	7.04	5.70
Hitachi Metals	2.48	2.53	2.46	2.58	2.98	3.37	2.84	2.63	2.22	2.73	2.69	1.89
Nisshin Steel	3.04	3.24	3.20	3.47	3.73	3.98	3.37	3.06	2.52	2.80	2.92	2.23
Daido Steel	2.31	2.24	2.16	2.23	2.66	2.75	2.36	2.19	1.75	2.05	2.22	1.63
Yodogawa Steel W.	1.34	1.37	1.34	1.37	1.38	1.45	1.28	1.14	0.95	1.05	1.00	0.75
Nippon Yakin K.	0.73	0.75	0.70	0.71	0.80	0.94	0.80	0.73	0.51	0.60	0.70	0.56
Kurimoto	0.92	1.04	1.19	1.37	1.44	1.53	1.41	1.26	1.10	1.04	1.10	0.88
Toa Steel Co., Ltd.	1.60	1.58	1.49	1.39	1.38	1.33	1.18	1.07	na	na	na	na
Tokyo Steel Mfg.	1.65	1.60	1.63	1.42	1.41	1.51	1.42	1.36	0.97	0.96	1.06	0.73
Aichi Steel	1.27	1.40	1.31	1.44	1.57	1.62	1.44	1.28	0.95	1.10	1.20	0.94
Japan Steel Works	0.94	1.11	1.69	1.38	1.10	1.10	1.15	1.12	0.96	0.97	0.94	0.93
Toyo Kohan	0.88	0.97	0.97	1.08	1.19	1.15	1.04	0.98	0.83	0.90	0.89	0.65
All Korean Firms	16.36	18.80	18.61	20.59	23.22	28.09	28.39	27.78	19.94	23.67	28.23	na
Sum of Large Firms	10.21	11.89	11.84	12.97	14.01	16.48	16.55	15.89	12.11	13.32	16.55	14.43
Pohang Steel	6.79	7.95	7.92	8.62	9.10	10.66	10.50	10.22	7.95	9.00	10.34	8.59
INI Steel	0.95	1.16	1.18	1.35	1.51	1.85	1.88	1.76	1.22	1.37	2.31	2.23
Kang Won Ind.	0.47	0.56	0.63	0.62	0.75	0.90	1.03	1.09	0.89	na	na	na
Dongkuk	0.73	0.87	0.86	1.00	1.13	1.31	1.33	1.17	0.99	1.20	1.37	1.38
Dongbu	0.93	0.98	0.93	0.98	1.06	1.23	1.25	1.11	0.72	0.99	1.31	1.12
Hyundai Hysco	0.33	0.37	0.33	0.40	0.45	0.54	0.56	0.54	0.34	0.76	1.23	1.11
All Taiwanese Firms	na	13.22	na	na	na	na	19.77	na	na	na	na	na
Sum of Large Firms	2.21	2.29	2.29	2.28	2.68	3.28	3.61	4.03	3.59	3.66	4.43	2.52
China Steel	2.21	2.29	2.29	2.28	2.68	3.16	3.11	3.41	2.94	2.79	3.22	2.52
Yieh United Steel	na	na	na	na	na	0.12	0.50	0.63	0.65	0.88	1.21	na
All Chinese Firms	22.73	25.76	34.49	49.32	32.14	34.96	34.33	35.22	35.17	na	45.22	na
Sum of Large Firms	9.86	11.50	14.99	21.40	15.33	17.22	16.65	17.15	16.16	17.55	22.28	na
Baosteel Group	na	na	na	na	na	na	na	na	na	5.46	8.23	na
Shanghai Steel Pl.	2.09	2.25	2.72	4.10	2.53	2.63	2.56	2.55	na	na	na	na
Baoshan	1.01	1.58	2.15	3.16	2.52	3.04	2.85	3.12	3.48	3.43	3.74	na
Shanghai Meishan	0.20	0.20	0.27	0.49	0.24	0.25	0.21	0.25	0.32	0.43	0.53	na
Shougang	1.44	1.49	2.04	2.61	2.25	2.50	2.06	2.17	2.33	2.20	2.78	na
Anshan	1.62	1.95	2.53	3.29	2.29	2.23	2.37	2.10	1.98	2.03	2.49	na
Wuhan	1.28	1.29	1.62	1.99	1.57	2.19	1.86	1.94	1.95	1.69	2.13	na
Panzhuhua	0.33	0.42	0.66	0.93	0.60	0.84	1.06	1.17	1.18	1.23	1.21	na
Baotou	0.42	0.49	0.65	1.23	0.75	0.97	1.02	1.08	0.98	1.02	1.07	na
Taiyuan	0.13	0.20	0.22	0.26	0.23	0.26	0.27	0.28	0.28	0.28	0.30	na
Benxi	0.44	0.57	0.75	1.11	0.93	0.94	0.90	0.82	1.98	0.91	1.21	na
Maanshan	na	na	na	na	na	na	na	na	na	na	1.08	na
Maanshan Magang	na	na	na	na	na	0.74	na	na	na	na	na	na
Maanshan Ir, & St,	0.51	0.57	0.75	1.13	0.79	0.09	0.92	0.90	0.85	0.76	na	na
Hunan Hualing	na	na	na	na	na	na	na	0.79	0.84	0.78	0.90	na
Xiangtan	0.19	0.20	0.25	0.44	0.24	0.21	0.21	na	na	0.31	0.38	na
Lianyuan	0.14	0.17	0.27	0.47	0.29	0.23	0.27	na	na	0.35	0.37	na
Hengyang	0.08	0.10	0.12	0.20	0.10	0.08	0.08	na	na	0.11	0.12	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 1b: Employment, Non-consolidated Accounting (thousands)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	373.8	372.3	364.8	365.9	347.5	335.9	310.4	308.3	280.8	277.8	261.3	252.1
Sum of Large Firms	163.2	162.6	163.3	158.0	143.9	132.0	120.1	112.4	108.4	98.5	89.6	81.9
Nippon Steel	38.2	37.4	36.3	34.6	31.1	27.6	24.5	22.6	21.4	19.8	18.9	17.4
NKK	22.3	22.7	22.9	22.2	20.2	17.7	16.2	15.6	15.2	11.7	11.7	10.5
Sumitomo Metal I.	20.3	20.7	22.5	22.1	19.6	17.2	15.4	13.5	15.3	14.5	10.7	8.4
Kobe Steel	21.5	20.6	20.2	19.4	17.8	15.7	13.4	12.6	11.7	10.6	9.8	9.7
Kawasaki Steel	18.0	18.2	18.1	17.3	15.8	13.7	12.3	11.5	11.0	10.4	9.9	9.3
Hitachi Metals	8.4	8.3	8.3	8.0	7.9	8.3	8.1	7.8	7.6	7.3	6.6	6.1
Nisshin Steel	7.5	7.7	7.8	7.7	7.4	6.9	6.4	6.0	5.6	5.0	4.3	4.0
Daido Steel	7.5	7.5	7.5	7.2	7.0	6.6	6.2	5.9	5.7	5.3	4.7	4.4
Yodogawa Steel W.	1.9	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.7
Nippon Yakin K.	1.7	1.7	1.8	1.7	1.7	1.6	1.6	1.4	1.2	1.1	1.1	1.0
Kurimoto	3.5	3.5	3.5	3.4	3.4	3.3	3.2	3.0	2.9	2.7	2.6	2.3
Toa Steel Co., Ltd.	1.8	1.8	1.8	1.8	na	1.7	1.5	1.4	na	na	na	na
Tokyo Steel Mfg.	1.4	1.5	1.5	1.5	1.5	1.4	1.3	1.3	1.3	1.2	1.1	1.1
Aichi Steel	3.4	3.4	3.5	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.7	2.7
Japan Steel Works	3.7	3.7	3.7	3.5	3.1	2.9	2.8	2.8	2.8	2.6	2.2	2.1
Toyo Kohan	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.5	1.5	1.4
All Korean Firms	88.1	72.6	71.1	73.7	73.4	75.9	74.2	70.1	63.8	66.5	64.2	na
Sum of Large Firms	35.2	36.4	35.2	33.1	33.3	31.3	31.0	30.2	28.4	26.4	28.2	27.8
Pohang Steel	24.1	25.1	23.6	22.6	22.9	20.4	20.2	19.6	19.3	19.5	19.3	19.2
INI Steel	2.8	2.8	3.1	3.1	3.2	3.2	3.1	3.0	2.8	2.7	4.7	4.6
Kang Won Ind.	2.4	2.5	2.4	2.3	2.2	2.5	2.5	2.3	2.0	na	na	na
Dongkuk	2.7	2.7	2.8	2.1	2.0	2.0	2.0	2.1	1.6	1.6	1.6	1.6
Dongbu	2.3	2.4	2.4	2.0	1.9	2.0	1.9	2.0	1.5	1.3	1.4	1.3
Hyundai Hysco	0.9	0.9	1.0	1.0	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.1
All Taiwanese Firms	na	88.5	na	na	na	na	91.3	na	na	na	na	na
Sum of Large Firms	9.7	9.7	9.6	9.6	9.4	9.4	10.7	10.6	na	10.4	10.3	na
China Steel	9.7	9.7	9.6	9.6	9.4	9.4	9.1	9.1	na	9.0	8.9	9.0
Yieh United Steel	na	na	na	na	na	na	1.6	1.6	1.3	1.4	1.4	na
All Chinese Firms	3,152.3	3,218.2	3,284.0	3,332.8	3,412.9	3,423.4	3,329.8	na	2,880.5	na	2,515.9	na
Sum of Large Firms	1,141.6	1,174.5	1,203.7	1,290.1	1,262.5	1,254.3	1,223.1	1,087.3	1,064.3	1,157.9	892.8	na
Baosteel Group	na	na	na	na	na	na	na	na	na	143.9	154.4	na
Shanghai Steel Plant	118.7	118.2	116.1	107.7	101.1	93.5	89.8	90.8	na	na	na	na
Baoshan	31.9	31.9	31.8	31.8	33.5	33.9	33.9	34.2	34.4	32.6	14.6	na
Shanghai Meishan	22.0	23.5	25.3	25.5	26.2	25.8	25.6	25.5	23.8	23.4	20.9	na
Shougang	186.3	195.9	222.3	262.3	259.8	246.4	229.8	218.0	211.9	206.6	136.0	na
Anshan	217.3	219.2	216.9	207.9	196.1	197.5	197.5	180.3	171.7	170.7	na	na
Wuhan	136.7	137.3	140.5	139.4	139.3	138.3	134.6	119.5	115.4	115.9	102.7	na
Panzhuhua	64.2	66.4	65.9	102.5	99.5	104.8	105.9	95.7	96.0	105.7	80.5	na
Baotou	77.3	80.1	80.0	105.1	98.4	100.9	98.1	94.4	89.5	90.3	80.3	na
Taiyuan	66.4	67.5	68.7	69.4	70.0	71.5	71.6	67.9	75.8	76.1	62.1	na
Benxi	94.0	100.7	101.0	100.7	101.0	102.6	100.6	91.4	89.2	87.7	99.4	na
Maanshan	na	na	na	na	na	na	na	na	na	na	69.5	na
Maanshan Magang	na	na	na	na	na	53.5	50.1	45.7	na	na	na	na
Maanshan Iron & Steel	75.7	80.3	82.1	83.3	84.0	29.6	27.6	23.9	46.1	45.0	na	na
Hunan Hualing	na	na	na	na	na	na	na	na	55.2	58.0	54.6	na
Xiangtan	25.9	26.0	24.9	24.4	25.1	24.8	26.4	na	25.7	25.9	22.3	na
Lianyuan	19.7	21.4	22.1	23.3	21.6	24.5	25.3	na	22.9	24.6	24.4	na
Hengyang	5.5	6.2	6.3	6.6	6.9	6.7	6.4	na	6.6	7.4	6.6	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 1c: Other Sales Indicators for Large Japanese Steel Firms

Indicator, Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sales, consolidated accounting (US\$ billions)												
Nippon Steel	22.71	24.22	23.65	25.49	28.99	30.64	27.18	25.07	21.55	24.03	24.89	20.63
NKK	13.74	14.48	14.89	16.48	18.13	18.73	16.67	15.77	14.13	15.11	16.17	13.22
Sumitomo Metal I.	12.85	13.63	13.52	11.34	13.38	14.84	12.94	11.98	10.52	12.77	13.55	10.79
Kobe Steel	10.30	10.91	10.69	11.58	13.44	15.31	13.61	12.51	10.20	11.23	12.42	9.57
Kawasaki Steel	9.30	10.34	10.50	10.99	11.56	12.07	10.94	10.14	8.55	11.27	11.90	9.72
Hitachi Metals	3.28	3.41	3.38	3.68	4.33	4.86	4.03	3.82	3.37	4.16	4.34	3.27
Nisshin Steel	3.38	3.59	3.54	3.83	4.32	4.72	4.07	3.77	3.11	3.86	4.03	3.15
Daido Steel	3.36	3.43	3.27	3.42	4.03	4.21	3.64	3.33	2.64	3.15	3.43	2.61
Yodogawa Steel W.	1.35	1.37	1.35	1.38	1.69	1.81	1.59	1.49	1.20	1.38	1.39	1.16
Nippon Yakin K.	1.39	1.45	1.41	1.51	1.71	1.86	1.62	1.43	1.08	1.22	1.30	1.03
Kurimoto	0.98	1.13	1.29	1.48	1.55	1.65	1.55	1.35	1.21	1.14	1.20	0.96
Toa Steel Co., Ltd.	1.66	1.65	1.57	1.48	1.47	1.41	1.25	1.13	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	0.44	1.68	1.49	1.39	1.05	1.23	1.41	1.12
Japan Steel Works	1.05	1.21	1.79	1.48	1.22	1.22	1.32	1.24	1.07	1.12	1.08	1.05
Toyo Kohan	0.94	1.04	1.04	1.16	1.27	1.28	1.16	1.08	0.92	1.03	1.01	0.77
Shares of Steel in Sales, consolidated accounting (percent)												
Nippon Steel	79.55	77.47	74.54	71.32	69.36	67.48	65.84	66.32	63.17	70.04	71.34	70.82
NKK	na	na	na	67.73	na	69.78	67.49	73.79	74.11	73.33	72.65	71.64
Sumitomo Metal I.	na	na	na	76.68	na	70.03	69.89	72.30	69.53	63.52	64.11	64.44
Kobe Steel	na	na	na	44.30	na	35.61	36.81	39.17	40.24	40.66	39.59	40.60
Kawasaki Steel	na	75.92	72.59	69.45	69.96	71.91	69.01	70.60	67.91	74.78	75.68	74.27
Hitachi Metals	na	na	na	53.40	na	50.85	68.56	67.93	77.69	80.50	82.08	83.29
Nisshin Steel	na	na	na	na	na	na	na	na	95.41	89.69	88.96	88.15
Daido Steel	na	na	na	64.50	na	82.42	82.71	84.62	86.00	58.98	59.89	57.22
Yodogawa Steel W.	na	na	na	85.66	na	97.61	98.03	98.09	98.16	96.37	93.20	93.92
Nippon Yakin K.	na	na	na	70.04	na	76.24	75.75	77.77	74.10	75.29	77.68	78.69
Kurimoto	na	na	na	90.82	na	48.08	91.99	93.91	94.33	93.17	93.55	94.27
Toa Steel Co., Ltd.	na	na	na	82.05	na	82.58	82.72	83.36	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	na	na	na	na	na	104.98	105.29	105.28
Japan Steel Works	na	na	na	28.33	na	34.31	30.42	30.76	30.11	31.47	31.73	28.05
Toyo Kohan	na	na	na	na	na	90.42	88.19	87.60	85.78	87.74	86.21	84.15
Shares of Steel in Sales, non-consolidated accounting (percent)												
Nippon Steel	88.06	85.89	83.20	80.65	81.64	83.14	80.17	81.90	79.42	78.91	79.56	79.42
NKK	74.82	74.37	71.86	71.21	62.63	63.80	61.07	65.49	64.93	na	na	na
Sumitomo Metal I.	87.14	85.63	81.85	82.23	83.35	79.81	84.16	84.72	79.42	na	na	na
Kobe Steel	48.53	48.45	47.44	48.34	44.81	43.61	44.31	47.16	49.26	na	na	na
Kawasaki Steel	77.20	76.65	75.33	71.13	72.66	76.05	74.40	76.19	74.84	na	na	84.67
Hitachi Metals	71.84	70.90	68.40	66.92	67.12	61.79	62.88	61.75	61.01	na	83.50	86.65
Nisshin Steel	91.68	91.37	91.87	90.57	90.51	91.71	90.96	92.10	92.68	na	na	na
Daido Steel	85.10	84.60	84.92	87.36	87.72	88.37	86.81	86.39	84.22	na	59.29	57.31
Yodogawa Steel W.	97.41	97.63	97.35	97.23	96.51	97.04	97.52	97.55	96.35	93.63	96.20	96.93
Nippon Yakin K.	86.94	88.20	88.85	86.09	85.01	86.30	87.00	86.78	85.34	na	na	na
Kurimoto	70.13	71.23	68.29	67.01	70.62	69.07	70.15	72.93	77.23	na	89.11	88.30
Toa Steel Co., Ltd.	91.81	90.50	89.47	87.37	87.02	86.96	87.36	88.00	na	na	na	na
Tokyo Steel Mfg.	99.54	99.54	98.86	99.26	99.73	98.97	98.85	98.66	99.45	99.59	99.73	99.80
Aichi Steel	99.39	99.50	99.34	99.22	na	98.84	98.38	98.37	97.23	na	na	na
Japan Steel Works	29.32	30.75	21.18	28.62	32.58	35.86	28.80	28.19	30.92	na	na	na
Toyo Kohan	98.17	98.58	98.75	98.66	98.58	91.88	89.46	88.22	86.16	na	89.20	88.12

Note: Shares may exceed 100 percent because intra-group activity are not netted out from the steel proportion.

Sources: See Appendix Tables 9a, 9b.

Appendix Table 1d: Other Employment Indicators for Large Japanese Steel Firms

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Employment, consolidated accounting (thousands)												
Nippon Steel	na	na	na	na	na	na	na	na	na	54.9	52.2	50.5
NKK	44.1	44.3	44.3	43.6	43.1	39.9	38.2	38.3	42.0	39.6	39.9	28.4
Sumitomo Metal I.	29.1	30.8	30.9	29.2	38.3	36.2	34.6	34.3	39.5	39.1	37.1	29.9
Kobe Steel	26.7	27.7	27.1	28.7	32.5	31.2	31.1	30.2	29.6	28.9	30.1	27.0
Kawasaki Steel	24.5	25.2	na	na	na	na	na	na	na	30.7	30.1	28.6
Hitachi Metals	15.1	15.7	15.8	14.8	23.3	22.7	21.3	21.9	25.0	26.9	23.8	22.9
Nisshin Steel	8.6	8.9	9.1	9.1	10.1	9.8	9.5	9.2	9.0	8.3	7.5	7.0
Daido Steel	10.6	11.1	11.0	10.6	10.5	10.2	9.7	9.4	9.1	10.5	10.2	9.6
Yodogawa Steel W.	2.0	2.0	2.1	2.6	2.7	2.7	2.5	2.6	2.5	2.8	3.0	2.8
Nippon Yakin K.	3.4	3.4	3.5	3.5	3.7	3.7	4.1	3.6	na	3.0	2.8	2.7
Kurimoto	3.7	3.7	3.7	3.7	3.7	3.6	3.5	3.4	3.2	3.0	2.9	2.7
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	3.4	3.3	3.2	3.7	3.6	4.0	3.9	3.8
Japan Steel Works	5.0	5.1	5.2	4.9	4.7	4.9	4.9	5.2	5.4	4.8	4.6	4.4
Toyo Kohan	na	2.2	2.4	2.4	2.7	2.8	2.9	2.9	3.0	2.8	2.8	2.8
Shares of Steel in Employment, consolidated accounting (percent)												
Nippon Steel	na	na	na	na	na	na	na	na	na	39.84	64.63	na
NKK	na	na	na	na	na	na	na	na	na	67.62	69.01	na
Sumitomo Metal I.	na	na	na	na	na	na	na	na	na	43.06	44.51	na
Kobe Steel	na	na	na	na	na	na	na	na	na	35.75	37.29	40.70
Kawasaki Steel	na	na	na	na	na	na	na	na	na	73.04	73.17	na
Hitachi Metals	na	na	na	na	na	na	na	na	na	58.26	63.32	na
Nisshin Steel	na	na	na	na	na	na	na	na	na	100.00	100.00	na
Daido Steel	na	na	na	na	na	na	na	na	na	41.31	42.24	na
Yodogawa Steel W.	na	na	na	na	na	na	na	na	na	89.09	81.92	na
Nippon Yakin K.	na	na	na	na	na	na	na	na	na	77.79	78.93	na
Kurimoto	na	na	na	na	na	na	na	na	na	87.91	87.70	na
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	na	na	na	na	na	66.81	66.43	na
Japan Steel Works	na	na	na	na	na	na	na	na	na	39.21	36.63	na
Toyo Kohan	na	na	na	na	na	na	na	na	na	70.59	69.52	na
Shares of Steel in Employment, non-consolidated accounting (percent)												
Nippon Steel	na	na	na	na	na	na	na	na	na	na	na	na
NKK	na	na	na	na	na	na	na	na	na	na	na	na
Sumitomo Metal I.	na	na	na	na	na	na	na	na	na	na	na	na
Kobe Steel	na	na	na	na	na	na	na	na	na	na	na	na
Kawasaki Steel	na	79.34	78.77	78.20	81.99	80.88	80.49	80.12	81.10	76.68	76.87	na
Hitachi Metals	na	na	na	na	na	na	na	na	na	na	na	na
Nisshin Steel	na	na	na	na	na	na	na	na	na	na	na	na
Daido Steel	na	na	na	na	na	na	na	na	na	na	na	na
Yodogawa Steel W.	na	na	na	na	na	na	na	na	na	na	na	na
Nippon Yakin K.	na	na	na	na	na	na	na	na	na	na	na	na
Kurimoto	na	na	na	na	na	na	na	na	na	na	na	na
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	na	na	na	na	na	na	na	na
Japan Steel Works	na	na	na	na	na	na	na	na	na	na	na	na
Toyo Kohan	na	na	na	na	na	na	na	na	na	na	na	na

Note: Shares may exceed 100 percent because intra-group activity are not netted out from the steel proportion.

Sources: See Appendix Tables 9a, 9b.

Appendix Table 2a: Operating Profit-Sales Ratios, Non-consolidated Accounting (percent)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	8.07	7.27	4.33	0.89	2.01	3.65	3.58	4.02	1.30	2.33	4.29	1.44
Nippon Steel	7.51	6.24	3.59	-0.96	3.71	5.96	5.88	8.33	4.40	4.95	6.35	1.89
NKK	6.41	6.99	2.78	0.33	1.02	5.44	5.01	4.55	-0.24	4.52	5.81	1.27
Sumitomo Metal I.	12.05	9.13	5.00	1.76	4.60	8.28	7.52	8.51	3.09	3.32	7.43	4.19
Kobe Steel	8.99	8.57	6.18	3.36	5.36	8.72	7.01	7.18	4.44	6.40	6.64	3.83
Kawasaki Steel	9.95	6.53	3.39	-0.75	1.65	4.48	5.24	6.79	2.84	3.85	6.93	2.99
Hitachi Metals	6.86	5.03	2.98	2.31	3.69	3.97	1.84	1.54	1.25	3.97	2.42	-7.22
Nisshin Steel	8.28	7.34	3.95	3.31	3.67	5.16	2.43	3.23	-0.65	4.25	7.21	-4.74
Daido Steel	3.72	4.10	1.36	-1.11	2.51	2.82	1.37	2.30	-0.80	3.68	4.66	0.70
Yodogawa Steel W.	8.36	8.51	6.23	6.39	6.31	5.54	5.26	5.08	4.02	0.84	0.99	0.57
Nippon Yakin K.	7.21	8.70	3.22	0.94	1.25	3.33	-1.93	-1.66	-8.80	-1.76	3.23	1.25
Kurimoto	4.98	6.16	5.53	5.77	4.90	5.15	5.51	4.90	1.53	1.07	2.00	-1.79
Toa Steel Co., Ltd.	11.06	11.97	10.18	3.09	-1.36	-1.98	-9.03	-14.81	na	na	na	na
Tokyo Steel Mfg.	26.02	23.82	10.81	-9.61	-6.58	-3.58	-5.12	-4.59	-7.12	-7.92	-1.98	-7.03
Aichi Steel	2.78	3.49	2.93	1.14	1.68	1.37	1.63	1.61	1.71	4.59	4.78	1.84
Japan Steel Works	6.28	6.29	7.16	2.31	-1.81	-0.81	2.56	4.46	4.11	2.10	3.31	2.48
Toyo Kohan	5.86	5.34	5.15	5.53	7.42	6.75	7.56	6.24	4.70	4.51	4.86	1.78
All Korean Firms	5.73	7.30	6.72	9.08	7.90	9.64	8.48	9.39	8.60	8.74	10.00	na
Pohang Steel	5.29	8.00	8.69	14.60	12.06	16.50	14.97	18.47	15.44	17.01	17.95	12.89
INI Steel	9.58	9.75	4.98	4.08	4.71	4.89	4.50	7.68	7.58	6.01	9.34	7.46
Kang Won Ind.	8.04	6.26	7.57	6.25	6.18	7.57	4.69	7.03	7.40	na	na	na
Dongkuk	9.28	7.69	4.61	5.08	5.67	5.09	6.46	3.90	1.33	4.06	3.93	8.67
Dongbu	4.44	5.24	4.06	5.44	5.18	6.06	5.01	7.82	7.48	6.13	6.25	6.01
Hyundai Hysco	2.11	3.34	4.50	3.86	3.59	3.84	2.62	8.75	2.79	1.68	8.10	10.38
All Taiwanese Firms	na	8.25	na	na	na	na	10.81	na	na	na	na	na
China Steel	na	na	na	na	16.85	22.95	18.07	22.79	18.44	16.46	21.09	8.69
Yieh United Steel	na	na	na	na	na	na	na	na	na	na	na	na

Note: Data not available for Chinese Firms.

Sources: See Appendix Tables 9a, 9b.

Appendix Table 2b: Net Profit-Sales Ratios, Non-consolidated Accounting (percent)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	2.95	2.84	0.94	-1.14	-1.46	1.47	0.45	0.49	-2.28	-1.62	-0.50	-2.44
Nippon Steel	2.19	3.19	0.21	-1.43	0.45	1.18	0.91	1.61	0.03	0.01	0.99	-1.67
NKK	1.76	2.73	0.02	-2.35	-3.02	5.15	1.37	1.00	-4.97	0.34	0.15	-1.94
Sumitomo Metal I.	4.12	1.95	0.03	-3.30	-2.65	1.53	1.19	0.24	-2.20	-10.18	0.69	0.13
Kobe Steel	1.77	2.24	1.00	-0.09	-8.98	6.05	1.90	0.66	-2.48	-1.81	-7.42	-2.64
Kawasaki Steel	3.21	2.27	0.01	-3.89	-2.95	2.31	1.07	1.08	-7.45	0.85	-3.55	-1.50
Hitachi Metals	3.67	2.67	1.63	1.28	1.82	2.52	1.87	1.81	-1.90	-4.19	1.21	-9.75
Nisshin Steel	5.77	2.04	-4.40	0.57	1.48	3.46	0.80	0.98	-0.93	-1.73	0.67	-8.31
Daido Steel	2.05	2.08	0.78	0.73	1.18	0.91	0.71	0.72	-0.87	0.29	1.35	0.42
Yodogawa Steel W.	4.54	4.13	3.24	3.03	3.50	3.69	4.13	3.66	1.93	1.20	1.00	-3.52
Nippon Yakin K.	1.74	2.84	0.03	-2.08	-3.10	0.83	-3.98	-2.00	-10.39	-7.38	-1.28	1.20
Kurimoto	2.59	2.44	2.74	2.56	2.78	2.93	2.54	1.31	0.08	0.52	0.17	-4.38
Toa Steel Co., Ltd.	8.40	8.87	8.14	1.17	-3.52	-4.89	-5.26	-18.20	na	na	na	na
Tokyo Steel Mfg.	15.20	14.74	7.18	-8.04	-6.22	-6.72	-7.06	-6.08	-9.43	-11.80	-2.90	-6.10
Aichi Steel	1.50	1.69	1.41	0.53	0.83	0.52	0.69	0.48	0.45	2.39	0.38	1.06
Japan Steel Works	1.86	14.51	1.13	-0.85	-3.73	-1.75	0.46	0.32	0.05	-2.54	-1.94	0.32
Toyo Kohan	4.03	2.58	2.35	2.34	3.77	3.26	3.13	2.67	1.10	2.57	3.30	1.03
All Korean Firms	1.52	2.78	1.11	2.95	3.19	4.78	2.04	-1.02	0.08	10.60	-5.59	na
Pohang Steel	1.64	2.50	2.99	4.26	5.24	10.22	7.39	7.50	10.08	14.57	14.00	7.39
INI Steel	4.72	3.62	1.57	1.06	2.29	1.65	0.89	0.29	0.09	3.72	2.44	1.19
Kang Won Ind.	2.03	3.23	2.87	2.05	1.85	1.84	0.04	0.04	-5.74	na	na	na
Dongkuk	4.74	4.22	3.71	2.01	3.10	2.05	7.44	4.27	3.65	3.55	-9.69	0.58
Dongbu	1.57	1.01	0.56	2.00	1.94	3.29	1.23	0.89	0.80	2.58	0.24	-0.29
Hyundai Hysco	1.44	0.93	0.49	-1.58	-1.01	-1.70	-1.71	0.72	1.44	-4.77	-5.77	1.13
All Taiwanese Firms	na	na	na	na	na	na	na	na	na	na	na	na
China Steel	20.13	17.41	14.04	8.86	13.47	9.80	11.25	16.02	18.62	16.82	18.46	8.77
Yieh United Steel	na	na	na	na	na	na	0.21	-4.45	-2.86	4.61	2.67	na
All Chinese Firms	6.12	5.19	5.40	10.21	9.50	3.89	1.54	0.35	0.31	na	3.06	na
Baosteel Group	na	na	na	na	na	na	na	na	na	3.32	2.27	na
Shanghai Steel Pl.	1.23	0.47	1.74	5.53	2.92	1.77	1.46	2.11	na	na	na	na
Baoshan	12.31	15.01	8.87	18.31	26.35	15.39	13.25	8.51	3.56	5.29	9.67	na
Shanghai Meishan	9.89	7.76	4.55	5.55	1.67	0.62	2.56	2.30	1.90	0.08	0.04	na
Shougang	23.24	21.93	20.27	19.66	22.46	14.87	1.06	1.16	1.75	1.38	-0.19	na
Anshan	9.83	9.45	7.16	10.88	11.37	1.77	1.78	0.47	0.50	0.49	0.01	na
Wuhan	15.34	13.40	7.96	13.84	15.42	7.25	4.85	2.49	1.87	2.37	3.44	na
Panzhuhua	0.64	8.30	2.81	6.45	5.65	0.09	0.02	0.03	0.07	0.08	3.45	na
Baotou	6.92	2.21	3.63	11.46	16.15	8.43	3.30	1.93	0.81	0.82	0.06	na
Taiyuan	39.99	18.63	18.12	33.78	38.93	23.32	8.91	8.90	5.26	8.23	4.51	na
Benxi	12.34	11.56	11.75	21.82	9.74	5.89	2.11	0.73	0.50	0.80	0.02	na
Maanshan	na	na	na	na	na	na	na	na	na	na	1.85	na
Maanshan Magang	na	na	na	na	na	0.80	na	na	na	na	na	na
Maanshan Ir, & St,	8.35	5.34	5.19	30.04	11.44	-0.27	1.25	0.97	-2.29	0.21	na	na
Hunan Hualing	na	na	na	na	na	na	na	2.21	1.96	2.60	3.75	na
Xiangtan	9.22	6.16	7.47	8.51	9.43	0.34	0.35	na	na	1.19	1.02	na
Lianyuan	6.27	4.67	9.68	18.45	16.97	2.40	1.14	na	na	4.20	0.52	na
Hengyang	7.34	7.59	6.24	6.83	0.35	0.03	1.01	na	na	1.71	5.14	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 2c: Profitability Indicators for Large Japanese Firms, Consolidated Accounting (percent)

Indicator, Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Operating Profit-Sales Ratios, All Operations												
Nippon Steel	7.78	6.07	3.93	-0.40	3.20	6.55	4.64	5.90	3.35	4.49	5.91	2.83
NKK	5.62	5.46	2.39	0.21	2.14	5.20	5.03	3.95	-0.23	3.67	4.51	-0.46
Sumitomo Metal I.	9.40	7.36	4.46	1.86	4.17	7.30	7.02	6.71	0.92	0.65	6.05	2.97
Kobe Steel	9.10	8.86	6.78	4.18	6.86	9.30	6.36	5.50	3.83	6.60	7.75	2.96
Kawasaki Steel	9.67	6.79	4.08	-0.48	1.16	3.73	4.87	6.01	2.40	3.57	6.03	3.61
Hitachi Metals	7.56	4.82	2.56	2.55	5.10	5.49	3.52	3.00	2.25	4.57	5.29	-2.69
Nisshin Steel	8.44	7.54	4.61	3.85	4.45	5.75	3.45	3.63	0.36	3.62	5.80	-2.63
Daido Steel	4.18	4.34	2.10	0.10	2.89	2.93	1.83	2.37	-0.79	3.49	4.89	1.62
Yodogawa Steel W.	8.40	8.55	6.25	6.40	6.78	6.89	5.63	6.04	3.83	2.24	1.85	1.26
Nippon Yakin K.	6.38	6.86	3.47	0.98	0.60	1.49	-0.70	-1.31	-4.60	0.17	3.52	1.41
Kurimoto	5.24	6.36	6.04	6.13	5.60	5.77	6.22	5.33	1.14	2.31	2.66	-1.08
Toa Steel Co., Ltd.	na	na	9.93	3.14	-0.81	-1.52	-8.81	-13.86	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	1.94	1.38	1.65	1.60	1.79	4.49	4.29	1.44
Japan Steel Works	6.42	6.45	6.91	2.44	-1.07	-0.18	2.85	4.28	4.04	2.61	3.86	3.25
Toyo Kohan	6.39	6.04	5.70	5.85	7.89	7.11	7.83	6.34	4.45	4.98	5.33	2.84
Net Profit-Sales Ratios, All Operations												
Nippon Steel	2.84	2.43	0.06	-1.97	-0.14	1.85	0.11	0.19	0.42	0.42	0.96	-1.10
NKK	1.52	0.42	-0.24	-2.27	-2.13	2.90	0.89	0.74	-6.00	-2.73	5.43	-4.08
Sumitomo Metal I.	2.98	1.65	0.04	-3.17	-2.18	1.50	1.82	0.27	-5.16	-10.19	0.39	-7.76
Kobe Steel	1.81	1.87	-1.07	-0.67	-6.92	6.11	1.14	-0.32	-2.98	-4.24	0.47	-2.38
Kawasaki Steel	3.31	1.04	-2.29	-1.86	-2.76	2.04	0.65	0.68	-10.40	0.99	-1.39	0.56
Hitachi Metals	3.47	1.90	0.74	1.00	2.30	4.25	1.59	0.68	-2.55	-0.27	2.02	-6.63
Nisshin Steel	5.38	2.08	-3.84	1.86	1.87	3.29	1.13	0.71	-1.25	-1.37	0.17	-6.39
Daido Steel	2.31	2.12	0.91	-0.62	1.02	0.93	0.63	0.41	-0.87	0.55	0.69	0.55
Yodogawa Steel W.	4.69	4.16	3.35	2.98	3.39	3.53	2.75	2.94	1.25	1.07	1.53	-2.59
Nippon Yakin K.	1.41	1.60	0.08	-1.92	-2.75	-1.02	-3.56	-2.74	-9.92	-4.55	-0.57	-4.72
Kurimoto	2.56	2.40	2.74	2.52	2.95	2.88	2.58	1.23	-0.88	0.80	-0.69	-4.66
Toa Steel Co., Ltd.	4.33	4.49	4.28	0.86	-3.66	-4.83	-4.31	-17.19	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	0.71	0.53	0.71	0.45	0.42	2.27	0.26	0.45
Japan Steel Works	1.95	13.35	1.19	-0.65	-3.48	-1.39	0.32	0.36	-0.04	-1.80	-1.51	0.57
Toyo Kohan	3.97	2.64	2.35	2.30	3.86	3.21	3.24	2.60	0.70	2.44	2.94	1.23

Sources: See Appendix Tables 9a, 9b.

Appendix Table 3a: Mean Sales per Employee, Non-consolidated Accounting (US\$ thousands)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	359	369	369	387	440	486	440	411	361	429	431	388
Nippon Steel	483	527	523	578	677	789	791	797	700	819	884	774
NKK	420	435	441	503	584	680	651	581	520	756	784	731
Sumitomo Metal I.	403	418	394	438	519	636	584	619	483	563	729	738
Kobe Steel	434	473	467	510	602	759	755	724	628	710	752	656
Kawasaki Steel	465	497	485	540	604	702	682	681	595	660	710	614
Hitachi Metals	295	305	296	322	377	406	350	337	293	372	408	308
Nisshin Steel	406	423	411	452	503	574	525	512	448	556	673	561
Daido Steel	306	298	290	311	381	414	382	371	309	388	476	373
Yodogawa Steel W.	691	685	654	654	666	718	647	595	496	557	563	440
Nippon Yakin K.	431	441	396	413	480	577	507	510	432	542	663	583
Kurimoto	266	298	341	400	427	468	444	412	383	388	426	378
Toa Steel Co., Ltd.	894	881	815	751	na	762	777	752	na	na	na	na
Tokyo Steel Mfg.	1,159	1,100	1,092	922	935	1,048	1,064	1,055	776	797	931	688
Aichi Steel	368	409	380	414	459	495	453	417	320	378	436	355
Japan Steel Works	255	299	458	397	353	382	408	392	342	381	432	445
Toyo Kohan	467	508	506	548	595	577	519	499	423	608	604	456
All Korean Firms	186	259	262	280	316	370	383	396	313	356	440	na
Pohang Steel	282	317	336	381	398	522	520	522	413	462	536	447
INI Steel	341	411	385	435	476	574	597	586	442	507	486	484
Kang Won Ind.	198	227	259	273	338	363	na	475	446	na	na	na
Dongkuk	270	323	311	471	558	656	670	558	621	760	858	866
Dongbu	402	413	392	485	549	621	na	550	478	736	961	847
Hyundai Hysco	362	403	347	402	423	436	na	433	270	585	967	985
All Taiwanese Firms	na	149	na	na	na	na	217	na	na	na	na	na
China Steel	227	236	237	238	287	337	344	376	na	310	363	280
Yieh United Steel	na	na	na	na	na	na	307	405	492	624	850	na
All Chinese Firms	7.2	8.0	10.5	14.8	9.4	10.2	10.3	na	12.2	na	18.0	na
Baosteel Group	na	na	na	na	na	na	na	na	na	38.0	53.3	na
Shanghai Steel Pl.	17.6	19.1	23.5	38.0	25.0	28.1	28.5	28.1	na	na	na	na
Baoshan	31.6	49.5	67.5	99.1	75.1	89.8	84.0	91.1	101.2	105.5	256.8	na
Shanghai Meishan	8.9	8.6	10.5	19.4	9.3	9.7	8.2	9.6	13.2	18.3	25.4	na
Shougang	7.7	7.6	9.2	9.9	8.7	10.1	9.0	9.9	11.0	10.7	20.5	na
Anshan	7.5	8.9	11.7	15.8	11.7	11.3	12.0	11.6	11.5	11.9	na	na
Wuhan	9.3	9.4	11.5	14.3	11.2	15.8	13.9	16.2	16.9	14.6	20.8	na
Panzhuhua	5.2	6.3	10.1	9.0	6.1	8.1	10.0	12.3	12.3	11.6	15.1	na
Baotou	5.4	6.2	8.1	11.7	7.7	9.6	10.4	11.4	11.0	11.2	13.3	na
Taiyuan	1.9	3.0	3.3	3.7	3.3	3.7	3.8	4.1	3.7	3.7	4.9	na
Benxi	4.6	5.7	7.4	11.0	9.2	9.2	8.9	9.0	22.2	10.4	12.2	na
Maanshan	na	na	na	na	na	na	na	na	na	na	15.6	na
Maanshan Magang	na	na	na	na	na	13.9	na	na	na	na	na	na
Maanshan Ir, & St,	6.8	7.0	9.2	13.6	9.4	3.0	33.2	37.7	18.4	16.8	na	na
Hunan Hualing	na	na	na	na	na	na	na	na	15.3	13.4	16.4	na
Xiangtan	7.3	7.6	10.0	18.0	9.7	8.6	7.9	na	na	12.1	17.1	na
Lianyuan	6.9	8.1	12.2	20.3	13.4	9.6	10.8	na	na	14.0	15.1	na
Hengyang	15.2	15.7	18.5	30.4	14.4	11.9	13.1	na	na	14.3	18.4	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 3b: Sales-Fixed Asset Ratios, Non-consolidated Accounting

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	2.33	2.10	1.74	1.61	1.60	1.67	1.62	1.73	1.43	1.59	1.59	1.52
Nippon Steel	2.07	1.99	1.74	1.58	1.57	1.62	1.75	1.83	1.58	1.41	1.50	1.33
NKK	1.17	1.14	1.01	0.95	0.98	1.06	1.14	1.09	1.08	1.13	1.21	1.18
Sumitomo Metal I.	1.38	1.25	1.08	1.01	1.00	1.06	1.02	1.02	0.99	1.03	1.04	1.08
Kobe Steel	1.75	1.51	1.24	1.11	1.16	1.30	1.35	1.36	1.15	1.07	1.07	1.04
Kawasaki Steel	1.43	1.40	1.24	1.14	1.01	0.97	1.06	1.16	1.10	1.07	1.17	1.12
Hitachi Metals	3.70	3.35	3.19	2.93	3.31	3.15	3.03	3.01	2.65	2.93	3.00	2.60
Nisshin Steel	1.61	1.47	1.32	1.32	1.34	1.35	1.40	1.42	1.14	1.09	1.14	1.05
Daido Steel	3.36	2.48	2.23	1.98	2.21	2.23	2.28	2.39	1.95	2.10	2.34	1.91
Yodogawa Steel W.	4.02	3.61	3.16	2.82	2.67	2.57	2.68	2.29	2.00	1.99	1.94	2.03
Nippon Yakin K.	1.48	1.34	1.13	0.94	0.95	0.99	0.91	0.92	0.70	0.77	0.64	0.60
Kurimoto	3.78	3.76	3.55	3.49	3.37	3.53	3.75	3.18	2.80	2.28	2.39	2.23
Toa Steel Co., Ltd.	2.20	2.05	1.57	1.07	0.66	0.50	0.54	0.55	na	na	na	na
Tokyo Steel Mfg.	4.61	2.53	1.73	1.47	1.38	1.14	1.18	1.39	1.28	1.25	1.54	1.33
Aichi Steel	2.18	2.32	1.89	1.71	1.85	1.94	2.04	1.90	1.54	1.68	1.94	1.89
Japan Steel Works	1.84	1.57	2.03	1.47	1.12	1.08	1.37	1.49	1.35	1.26	1.34	1.55
Toyo Kohan	5.37	4.19	3.99	3.51	2.54	1.73	1.82	1.72	1.66	1.53	1.53	1.31
All Korean Firms	2.28	2.30	2.13	2.06	2.03	na	1.96	2.06	2.25	2.44	2.56	na
Pohang Steel	0.66	0.75	0.81	1.02	1.13	1.12	1.02	1.05	1.13	1.11	1.27	1.17
INI Steel	2.23	2.23	2.48	3.24	2.82	3.30	2.60	1.61	1.25	1.24	1.03	1.13
Kang Won Ind.	1.80	1.84	1.99	1.51	1.52	1.56	1.49	1.09	1.10	na	na	na
Dongkuk	1.64	1.88	1.41	1.62	1.89	2.14	1.83	0.93	0.75	0.80	0.88	1.04
Dongbu	2.50	2.69	2.40	2.62	2.76	2.95	1.43	0.92	0.64	0.66	0.88	0.95
Hyundai Hysco	3.54	2.71	2.06	2.31	2.40	2.45	2.31	1.45	0.31	0.52	0.88	0.91
All Taiwanese Firms	na	1.25	na	na	na	na	1.06	na	na	na	na	na
China Steel	na	na	na	na	0.70	0.75	0.67	0.73	0.75	0.70	0.85	0.76
Yieh United Steel	na	na	na	na	na	na	na	na	na	na	na	na
All Chinese Firms	1.40	1.48	1.71	2.21	1.55	1.30	1.12	na	0.94	na	na	na
Baosteel Group	na	na	na	na	na	na	na	na	na	0.68	na	na
Shanghai Steel Pl.	na	na	na	na	4.99	4.82	4.33	3.51	na	na	na	na
Baoshan	na	na	na	na	0.38	0.43	0.40	0.45	0.37	0.27	0.47	na
Shanghai Meishan	na	na	na	na	1.60	1.51	0.91	0.90	0.99	0.74	0.56	na
Shougang	2.15	2.23	2.87	1.89	1.63	1.03	0.85	0.92	1.01	0.95	0.89	na
Anshan	0.90	1.14	0.95	1.21	1.26	1.11	0.70	0.62	0.57	0.57	0.51	na
Wuhan	0.85	0.88	0.94	0.73	0.80	0.76	0.62	0.58	0.49	0.36	0.42	na
Panzhuhua	1.01	0.71	1.16	1.00	0.85	1.14	1.07	0.79	0.80	0.86	0.74	na
Baotou	0.80	1.03	1.34	2.00	0.99	1.19	1.01	0.86	0.69	0.65	0.49	na
Taiyuan	0.39	0.67	0.60	0.64	0.81	0.50	0.30	0.27	0.18	0.19	0.18	na
Benxi	0.68	0.94	1.08	1.10	1.32	1.27	1.09	0.94	2.18	0.73	0.63	na
Maanshan	na	na	na	na	na	na	na	na	na	na	0.66	na
Maanshan Magang	na	na	na	na	na	0.89	na	na	na	na	na	na
Maanshan Ir, & St,	1.36	1.40	1.69	1.62	0.94	0.52	0.83	0.81	0.80	0.51	na	na
Hunan Hualing	na	na	na	na	na	na	na	1.53	1.63	0.87	0.78	na
Xiangtan	1.81	1.70	2.18	3.00	1.72	1.03	1.05	na	na	0.77	0.86	na
Lianyuan	1.76	1.74	2.50	2.64	2.73	1.47	1.36	na	na	1.29	0.94	na
Hengyang	4.27	5.65	2.51	2.95	2.14	1.70	1.58	na	na	0.52	0.46	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 3c: Productivity Indicators for Large Japanese Firms, Consolidated Accounting

Indicator, Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Sales per Employee (US\$ thousands)												
Nippon Steel	na	na	na	na	na	na	na	na	na	438	476	na
NKK	311	327	336	378	421	469	436	411	336	382	406	na
Sumitomo Metal I.	441	442	437	388	350	410	374	349	267	326	366	360
Kobe Steel	386	394	395	404	414	491	437	414	345	389	412	355
Kawasaki Steel	380	411	na	na	na	na	na	na	na	367	396	na
Hitachi Metals	218	217	214	248	186	215	189	174	135	155	182	143
Nisshin Steel	391	403	387	421	429	481	430	409	348	465	534	na
Daido Steel	315	309	298	322	383	414	373	353	289	300	337	na
Yodogawa Steel W.	679	675	646	526	624	680	626	580	475	492	467	na
Nippon Yakin K.	410	423	400	432	460	501	397	401	na	401	457	na
Kurimoto	264	305	345	396	418	455	437	395	376	380	411	na
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	132	506	462	374	288	310	365	na
Japan Steel Works	209	238	345	301	260	250	269	239	197	235	238	na
Toyo Kohan	na	469	432	474	474	465	404	373	304	364	361	na
Sales-Fixed Asset Ratios												
Nippon Steel	2.03	1.91	1.68	1.53	1.46	1.50	1.60	1.63	1.51	1.42	1.53	1.42
NKK	1.36	1.32	1.16	1.09	1.13	1.26	1.34	1.21	1.37	1.14	1.26	1.38
Sumitomo Metal I.	1.84	1.64	1.42	1.02	1.08	1.15	1.17	1.14	1.02	1.00	1.11	1.10
Kobe Steel	1.78	1.55	1.30	1.16	1.23	1.39	1.41	1.43	1.20	1.23	1.33	1.11
Kawasaki Steel	1.51	1.44	1.30	1.15	1.07	1.06	1.20	1.30	1.20	1.07	1.13	1.19
Hitachi Metals	3.23	2.95	2.84	2.67	2.67	2.80	2.48	2.44	2.11	2.33	2.39	2.32
Nisshin Steel	1.67	1.49	1.30	1.29	1.35	1.40	1.45	1.50	1.22	1.30	1.37	1.28
Daido Steel	3.72	2.89	2.56	2.31	2.51	2.53	2.58	2.64	2.14	2.17	2.36	2.04
Yodogawa Steel W.	4.01	3.60	3.15	2.17	2.55	2.57	2.71	2.55	2.16	2.00	1.89	1.87
Nippon Yakin K.	2.25	2.09	1.88	1.67	1.64	1.59	1.47	1.47	1.19	1.24	1.00	0.93
Kurimoto	3.86	3.84	3.49	3.42	3.30	3.46	3.69	3.12	2.83	2.29	2.35	2.20
Toa Steel Co., Ltd.	na	na	na	1.14	0.68	0.51	0.55	0.56	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	0.53	2.00	2.09	1.98	1.64	1.65	1.96	1.86
Japan Steel Works	2.01	1.69	2.13	1.55	1.22	1.17	1.51	1.61	1.47	1.41	1.49	1.70
Toyo Kohan	5.50	4.34	4.09	3.60	2.52	1.81	1.88	1.73	1.51	1.46	1.46	1.29

Sources: See Appendix Tables 9a, 9b.

Appendix Table 4: Operating Profit-Sales Ratios and Sales per Employee for Steel Operations in Large Japanese Firms, Consolidated Accounting

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Operating Profit-Sales Ratios (percent)												
Nippon Steel	7.84	6.35	3.60	-2.73	3.15	5.77	5.44	8.27	3.75	3.90	5.89	1.28
NKK	na	na	na	-2.46	na	5.17	4.81	3.93	0.68	4.59	4.63	-2.72
Sumitomo Metal I.	na	na	na	2.34	na	9.14	8.39	8.85	3.23	2.07	7.43	5.82
Kobe Steel	na	na	na	4.55	na	10.51	9.40	9.97	7.03	8.42	8.58	2.32
Kawasaki Steel	na	9.09	5.74	0.62	2.05	4.74	7.19	8.59	4.36	3.65	6.65	3.90
Hitachi Metals	na	na	na	2.94	na	3.94	na	na	4.28	5.19	5.55	-0.53
Nisshin Steel	na	na	na	na	na	na	na	na	na	na	na	na
Daido Steel	na	na	na	-0.45	na	2.84	1.65	2.34	-1.15	5.57	5.35	0.77
Yodogawa Steel W.	na	na	na	6.76	na	6.69	5.60	5.58	4.27	2.28	1.87	1.32
Nippon Yakin K.	na	na	na	0.29	na	3.01	-0.30	0.38	-5.77	-0.63	3.94	1.50
Kurimoto	na	na	na	6.25	na	11.52	6.54	7.55	1.16	2.23	3.20	-0.53
Toa Steel Co., Ltd.	na	na	na	5.02	na	-2.55	-10.55	-17.32	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	na	na	na	na	na	8.81	4.00	1.22
Japan Steel Works	na	na	na	5.44	na	1.91	1.04	3.66	2.68	2.91	6.84	8.44
Toyo Kohan	na	na	na	na	na	6.70	7.07	6.34	5.59	6.28	6.59	3.55
Sales per Employee (US\$ thousands)												
Nippon Steel	na	na	na	na	na	na	na	na	na	770	526	na
NKK	na	na	na	na	na	na	na	na	na	414	427	na
Sumitomo Metal I.	na	na	na	na	na	na	na	na	na	481	527	na
Kobe Steel	na	na	na	na	na	na	na	na	na	443	438	354
Kawasaki Steel	na	na	na	na	na	na	na	na	na	376	410	na
Hitachi Metals	na	na	na	na	na	na	na	na	na	214	237	na
Nisshin Steel	na	na	na	na	na	na	na	na	na	417	475	na
Daido Steel	na	na	na	na	na	na	na	na	na	429	478	343
Yodogawa Steel W.	na	na	na	na	na	na	na	na	na	533	531	na
Nippon Yakin K.	na	na	na	na	na	na	na	na	na	388	450	na
Kurimoto	na	na	na	na	na	na	na	na	na	403	438	na
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	na	na	na	na	na	488	578	na
Japan Steel Works	na	na	na	na	na	na	na	na	na	188	206	na
Toyo Kohan	na	na	na	na	na	na	na	na	na	452	447	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 5a: Fixed Assets per Employee, Non-consolidated Accounting (US\$ thousands)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	154	176	211	240	275	290	271	238	252	270	271	255
Nippon Steel	234	265	300	367	431	486	453	436	444	579	589	na
NKK	358	380	435	527	594	644	573	532	483	669	709	na
Sumitomo Metal I.	292	335	365	436	518	603	575	608	489	546	647	683
Kobe Steel	248	313	376	458	519	583	559	534	546	665	700	632
Kawasaki Steel	324	356	390	474	597	725	643	587	540	619	606	na
Hitachi Metals	80	91	93	110	114	129	116	112	110	127	136	na
Nisshin Steel	252	288	310	343	377	425	375	360	393	513	588	na
Daido Steel	91	120	130	157	173	186	167	155	159	185	204	na
Yodogawa Steel W.	172	190	207	232	249	280	241	260	248	280	291	na
Nippon Yakin K.	291	329	351	438	506	581	557	555	618	702	1,039	na
Kurimoto	70	79	96	115	127	133	119	130	137	170	178	na
Toa Steel Co., Ltd.	406	431	518	700	na	1,533	1,437	1,373	na	na	na	na
Tokyo Steel Mfg.	251	434	632	629	679	920	898	760	609	640	603	na
Aichi Steel	169	177	202	243	248	255	223	219	208	224	225	na
Japan Steel Works	139	191	226	270	314	353	298	263	253	302	322	na
Toyo Kohan	87	121	127	156	234	334	285	290	254	397	395	na
All Korean Firms	82	113	123	135	156	na	195	193	139	146	172	na
Pohang Steel	429	421	414	373	353	464	512	495	364	415	424	381
INI Steel	153	184	155	134	169	174	230	365	352	408	474	429
Kang Won Ind.	110	123	130	180	223	233	275	438	406	na	na	na
Dongkuk	164	172	220	290	294	306	365	601	830	953	980	830
Dongbu	161	154	163	186	199	211	461	599	746	1,122	1,096	894
Hyundai Hysco	102	149	169	174	176	178	197	299	879	1,132	1,104	1,077
All Taiwanese Firms	na	120	na	na	na	na	205	na	na	na	na	na
China Steel	na	na	na	na	407	452	513	513	na	441	427	369
All Chinese Firms	5.1	5.4	6.1	6.7	6.1	7.8	9.2	na	13.1	na	na	na
Baosteel Group	na	na	na	na	na	na	na	na	na	55.5	na	na
Shanghai Steel Pl.	na	na	na	na	5.0	5.8	6.6	8.0	na	na	na	na
Baoshan	na	na	na	na	197.7	207.8	209.6	201.1	270.0	395.7	547.2	na
Shanghai Meishan	na	na	na	na	5.8	6.5	9.1	10.7	13.3	24.6	45.5	na
Shougang	3.6	3.4	3.2	5.3	5.3	9.8	10.5	10.8	10.8	11.2	23.1	na
Anshan	8.3	7.8	12.3	13.0	9.2	10.2	17.1	18.8	20.3	20.8	na	na
Wuhan	11.0	10.7	12.2	19.7	14.0	20.9	22.5	27.9	34.7	40.2	49.0	na
Panzhuhua	5.1	9.0	8.7	9.0	7.1	7.1	9.4	15.5	15.3	13.6	20.2	na
Baotou	6.8	6.0	6.1	5.8	7.7	8.1	10.3	13.2	15.8	17.3	27.0	na
Taiyuan	4.9	4.5	5.5	5.8	4.0	7.3	12.8	15.0	20.4	19.8	27.2	na
Benxi	6.8	6.0	6.9	10.0	7.0	7.3	8.2	9.6	10.2	14.4	19.3	na
Maanshan	na	na	na	na	na	na	na	na	na	na	23.8	na
Maanshan Magang	na	na	na	na	na	15.6	na	na	na	na	na	na
Maanshan Ir, & St,	5.0	5.0	5.4	8.4	10.0	5.8	39.9	46.8	23.2	32.7	na	na
Hunan Hualing	na	na	na	na	na	na	na	na	9.4	15.4	21.0	na
Xiangtan	4.0	4.5	4.6	6.0	5.7	8.3	7.5	na	na	15.6	19.9	na
Lianyuan	3.9	4.6	4.9	7.7	4.9	6.5	7.9	na	na	10.9	16.1	na
Hengyang	3.6	2.8	7.4	10.3	6.7	7.0	8.3	na	na	27.6	40.2	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 5b: Compensation per Employee, Non-consolidated Accounting (US\$)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	37,237	42,115	44,760	50,744	55,545	57,560	50,606	47,435	43,696	47,921	48,379	41,825
Nippon Steel	53,344	56,071	60,553	73,078	78,441	81,594	75,520	66,462	63,251	na	na	na
NKK	51,423	53,626	57,576	65,680	71,766	78,149	69,895	64,964	61,839	70,655	71,858	na
Sumitomo Metal I.	42,066	45,707	46,697	54,228	60,569	65,374	56,908	52,593	45,046	52,289	na	na
Kobe Steel	44,198	49,497	52,251	58,840	63,171	65,866	59,766	57,278	52,202	61,476	63,826	55,310
Kawasaki Steel	52,370	58,876	60,005	69,434	78,129	84,384	71,638	64,292	58,996	67,394	na	na
Hitachi Metals	45,004	49,727	50,493	58,857	64,529	66,296	58,662	55,463	47,585	57,030	na	na
Nisshin Steel	43,292	45,798	50,320	57,650	62,208	68,702	59,713	56,378	49,422	57,926	na	na
Daido Steel	50,163	53,743	56,373	64,245	70,361	76,539	66,526	63,742	58,188	64,904	na	na
Yodogawa Steel W.	35,080	37,518	40,315	45,330	48,373	50,999	45,237	41,938	39,103	43,656	na	na
Nippon Yakin K.	38,463	42,220	45,050	51,450	54,288	58,091	51,425	50,076	47,941	44,262	na	na
Kurimoto	40,811	45,200	49,421	58,138	62,695	64,907	58,560	53,197	49,999	56,093	na	na
Toa Steel Co., Ltd.	43,650	46,961	50,184	57,682	na	71,237	59,913	58,524	na	na	na	na
Tokyo Steel Mfg.	58,708	62,966	68,229	71,097	72,405	73,286	67,332	61,284	57,279	57,098	na	na
Aichi Steel	39,921	43,569	45,500	50,504	52,878	57,430	52,352	47,394	43,321	51,659	na	na
Japan Steel Works	38,848	42,819	45,479	52,218	58,552	60,938	53,639	50,100	46,122	50,400	na	na
Toyo Kohan	37,341	41,946	44,446	50,033	53,215	55,120	43,683	41,320	40,116	61,416	na	na
All Korean Firms	13,269	16,264	16,577	17,102	19,399	21,884	24,105	20,859	13,686	16,128	19,969	na
Pohang Steel	na	na	20,546	20,882	30,710	32,094	31,509	27,598	16,902	23,066	29,850	na
INI Steel	na	na	20,201	22,461	26,449	30,349	35,641	28,889	20,534	24,328	26,887	na
Kang Won Ind.	na	na	18,463	19,416	20,182	20,305	23,467	23,585	16,682	na	na	na
Dongkuk	na	na	18,713	23,187	21,065	23,321	25,555	16,544	15,407	15,429	18,823	na
Dongbu	na	na	16,853	20,912	22,582	26,011	24,730	16,962	7,556	20,822	22,987	na
Hyundai Hysco	na	na	19,153	20,787	22,332	20,442	22,918	20,662	11,478	18,259	24,271	na
All Taiwanese Firms	na	15,056	na	na	na	na	18,863	na	na	na	na	na
China Steel	na	na	na	na	na	na	na	na	na	na	na	na
All Chinese Firms	587	581	785	949	842	961	1,051	na	1,168	na	1,401	na
Baosteel Group	na	na	na	na	na	na	na	na	na	2,295	2,684	na
Shanghai Steel Pl.	673	701	962	1,534	1,317	1,581	1,643	1,737	na	na	na	na
Baoshan	770	831	1,197	1,900	1,853	2,395	2,971	3,135	3,640	4,586	5,776	na
Shanghai Meishan	803	759	880	1,391	1,412	1,670	1,857	1,985	2,024	1,981	2,541	na
Shougang	669	648	745	1,012	981	1,109	1,251	1,234	1,211	1,203	1,629	na
Anshan	658	650	780	1,088	968	1,095	1,227	1,300	1,254	1,244	na	na
Wuhan	697	725	866	1,226	1,162	1,338	1,461	1,610	1,499	1,539	1,806	na
Panzhihua	625	654	721	967	1,028	1,186	1,302	1,405	1,324	1,310	1,554	na
Baotou	573	539	625	960	963	936	1,110	1,274	1,041	1,069	1,175	na
Taiyuan	661	666	742	1,038	927	1,120	1,366	1,351	1,319	1,391	1,700	na
Benxi	699	639	791	1,032	920	1,089	1,333	1,226	1,163	1,146	1,413	na
Maanshan	na	na	na	na	na	na	na	na	na	na	501	na
Maanshan Magang	na	na	na	na	na	1,368	1,470	1,494	na	na	na	na
Maanshan Ir. & St.	635	619	722	1,333	1,119	1,380	1,474	1,525	1,473	1,438	na	na
Hunan Hualing	na	na	na	na	na	na	na	na	1,727	1,339	1,857	na
Xiangtan	655	624	842	1,139	976	1,037	1,037	na	946	1,188	1,568	na
Lianyuan	599	636	826	1,409	1,093	1,200	1,172	na	1,174	1,567	1,778	na
Hengyang	578	620	727	971	1,066	793	824	na	1,085	1,113	1,228	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 5c: Fixed Assets per Employee in Large Japanese Firms, Consolidated Accounting (US\$ thousands)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Nippon Steel	na	na	na	na	na	na	na	na	na	308	312	na
NKK	230	248	289	348	373	373	325	340	245	334	321	na
Sumitomo Metal I.	240	269	308	380	324	356	321	307	261	325	330	329
Kobe Steel	216	254	303	347	335	354	310	290	286	317	309	319
Kawasaki Steel	252	284	na	na	na	na	na	na	na	342	351	na
Hitachi Metals	67	73	75	93	70	77	76	71	64	66	76	61
Nisshin Steel	234	270	298	326	318	344	296	273	284	359	391	na
Daido Steel	85	107	117	139	153	164	145	134	135	138	143	na
Yodogawa Steel W.	169	187	205	243	245	265	231	227	220	247	247	na
Nippon Yakin K.	182	202	213	259	280	316	270	274	na	324	460	na
Kurimoto	68	79	99	116	127	132	118	127	133	166	175	na
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	250	253	220	188	175	188	186	na
Japan Steel Works	104	141	162	195	214	214	178	148	134	166	159	na
Toyo Kohan	na	108	106	131	188	257	214	216	201	250	246	na

Note: Compensation per Employee is not available on a consolidated basis.

Sources: See Appendix Tables 9a, 9b.

Appendix Table 6a: Foreign Sales or Exports, Non-consolidated Accounting (US\$ billions)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Japanese Exports	13.016	14.026	13.783	14.938	14.962	17.728	15.726	16.446	15.493	14.178	15.792	14.416
Large Japanese Firms, non-consolidated accounting												
Sum of Large firms	na	na	na	14.631	na	17.137	15.520	15.622	13.772	14.002	na	na
Nippon Steel	3.671	4.023	4.390	4.352	4.388	5.028	4.698	4.881	3.949	3.900	3.826	3.250
NKK	1.916	1.976	1.699	2.263	2.321	2.483	2.372	2.074	2.090	2.244	na	na
Sumitomo Metal I.	1.824	1.947	1.852	2.130	2.160	2.511	2.129	2.242	2.058	2.056	na	2.224
Kobe Steel	1.718	1.603	1.595	1.856	1.905	2.037	1.865	1.773	1.544	1.484	na	na
Kawasaki Steel	1.860	1.897	1.890	2.086	2.507	2.524	2.320	2.451	2.185	2.264	2.348	2.218
Hitachi Metals	0.313	0.315	0.336	0.334	0.423	0.576	0.442	0.420	0.396	0.605	0.599	0.354
Nisshin Steel	0.436	0.393	0.400	0.402	0.509	0.636	0.493	0.494	0.426	0.423	na	na
Daido Steel	0.162	0.152	0.203	0.179	0.212	0.214	0.218	0.240	0.179	0.209	0.252	0.185
Yodogawa Steel W.	0.062	0.050	0.053	0.047	0.055	0.074	0.046	0.052	0.069	0.095	na	na
Nippon Yakin K.	0.134	0.121	0.127	0.113	0.152	0.213	0.185	0.168	0.105	0.121	na	na
Kurimoto	0.033	0.048	0.036	0.037	0.028	0.033	0.033	0.044	0.023	0.017	na	na
Toa Steel Co., Ltd.	0.029	0.031	0.062	0.123	0.101	0.077	0.082	0.077	na	na	na	na
Tokyo Steel Mfg.	0.015	0.153	0.121	0.209	0.103	0.202	0.083	0.168	0.197	0.060	0.092	na
Aichi Steel	0.117	0.106	0.093	0.102	0.094	0.097	0.081	0.084	0.068	0.077	na	na
Japan Steel Works	0.251	0.247	0.270	0.347	0.366	0.355	0.374	0.337	0.389	0.349	na	na
Toyo Kohan	0.043	0.039	0.044	0.051	0.054	0.078	0.098	0.116	0.094	0.097	na	na
Korean Exports	3.845	4.096	4.773	5.142	4.801	5.590	5.504	5.995	7.557	6.309	7.194	6.265
Large Korean Firms, non-consolidated accounting												
Sum of Large firms	3.597	3.921	4.552	5.141	4.713	5.077	4.677	5.006	5.394	5.645	4.700	4.207
Pohang Steel	2.981	3.286	3.778	4.199	3.875	4.200	3.790	4.085	3.647	3.654	2.619	2.233
INI Steel	0.104	0.136	0.261	0.281	0.287	0.350	0.367	0.303	0.480	0.929	0.619	0.572
Kang Won Ind.	0.071	0.075	0.057	0.102	0.112	0.083	0.090	0.116	0.187	na	na	na
Dongkuk	0.079	0.070	0.118	0.207	0.120	0.066	0.081	0.081	0.534	0.458	0.474	0.559
Dongbu	0.255	0.236	0.236	0.234	0.202	0.249	0.229	0.259	0.378	0.358	0.558	0.491
Hyundai Hysco	0.106	0.118	0.102	0.117	0.118	0.128	0.120	0.161	0.169	0.246	0.430	0.352
Taiwanese Exports	1.105	1.174	1.207	1.606	1.736	2.552	2.776	3.294	3.630	4.009	5.201	4.302
Taiwanese Firms, non-consolidated accounting (foreign sales used instead of exports)												
All Taiwanese Firms	na	1.091	na	na	na	na	2.138	na	na	na	na	na
China Steel	0.420	0.434	0.434	0.433	0.386	0.599	0.560	0.613	na	na	0.749	0.821
Chinese Exports	1.314	1.726	1.501	1.243	1.866	5.493	4.199	5.137	4.004	3.388	5.322	3.975

Sources: See Appendix Tables 9a, 9b.

Appendix Table 6b: Export-Sales Ratios, Non-consolidated Accounting (percent)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Japanese Exports	9.71	10.20	10.25	10.54	9.80	10.86	11.52	12.97	15.29	11.89	14.01	14.76
Large Japanese Firms, non-consolidated accounting												
Sum of Large firms	na	na	na	18.64	na	19.70	20.49	22.60	24.20	22.64	na	na
Nippon Steel	19.88	20.40	23.13	21.74	20.86	23.09	24.22	27.16	26.35	24.02	22.87	24.19
NKK	20.41	20.04	16.79	20.27	19.68	20.65	22.55	22.89	26.39	25.26	na	na
Sumitomo Metal I.	22.28	22.44	20.85	22.03	21.22	22.91	23.60	26.78	27.86	25.21	na	36.00
Kobe Steel	18.37	16.43	16.91	18.74	17.76	17.13	18.40	19.51	21.06	19.76	na	na
Kawasaki Steel	22.16	20.94	21.60	22.38	26.31	26.22	27.66	31.30	33.46	32.97	33.33	38.94
Hitachi Metals	12.63	12.46	13.66	12.92	14.18	17.12	15.57	15.99	17.83	22.19	22.25	18.69
Nisshin Steel	14.34	12.15	12.50	11.59	13.66	15.99	14.63	16.12	16.93	15.11	na	na
Daido Steel	7.02	6.77	9.42	8.01	7.98	7.77	9.23	10.96	10.23	10.22	11.37	11.35
Yodogawa Steel W.	4.62	3.67	3.96	3.45	3.94	5.06	3.57	4.56	7.24	9.06	na	na
Nippon Yakin K.	18.30	16.08	18.27	16.01	18.97	22.73	23.26	23.05	20.74	20.04	na	na
Kurimoto	3.63	4.62	3.02	2.74	1.94	2.15	2.36	3.51	2.04	1.60	na	na
Toa Steel Co., Ltd.	1.84	1.95	4.13	8.88	7.35	5.77	7.00	7.21	na	na	na	na
Tokyo Steel Mfg.	0.94	9.56	7.43	14.75	7.30	13.36	5.85	12.37	20.27	6.29	8.64	na
Aichi Steel	9.26	7.52	7.06	7.11	5.98	5.98	5.65	6.57	7.18	7.04	na	na
Japan Steel Works	26.64	22.19	15.94	25.03	33.24	32.28	32.38	30.20	40.73	35.82	na	na
Toyo Kohan	4.95	4.01	4.54	4.68	4.54	6.77	9.44	11.87	11.32	10.79	na	na
Korean Exports	23.51	21.79	na	25.51	21.16	19.90	19.39	21.58	37.89	26.65	25.48	na
Large Korean Firms, non-consolidated accounting												
Sum of Large firms	35.23	32.97	38.44	39.63	33.65	30.81	28.25	31.51	44.54	42.39	28.40	29.15
Pohang Steel	43.92	41.35	47.71	48.70	42.56	39.42	36.10	39.99	45.88	40.61	25.34	26.00
INI Steel	10.92	11.69	22.18	20.80	19.02	18.91	19.53	17.20	39.50	67.72	26.84	25.70
Kang Won Ind.	15.06	13.48	9.06	16.40	14.97	9.32	8.75	10.61	20.93	na	na	na
Dongkuk	10.93	8.08	13.80	20.80	10.62	5.03	6.08	6.96	53.81	38.08	34.69	40.40
Dongbu	27.31	23.98	25.31	23.90	18.96	20.34	18.31	23.40	52.27	36.22	42.50	43.90
Hyundai Hysco	31.87	31.63	30.81	29.30	26.23	23.84	21.31	29.77	49.79	32.53	35.11	31.60
Taiwanese Exports	na	8.88	na	na	na	na	14.04	na	na	na	na	na
Taiwanese Firms, non-consolidated accounting (foreign sales used instead of exports)												
All Taiwanese Firms	na	8.25	na	na	na	na	10.81	na	na	na	na	na
China Steel	19.00	18.96	18.96	19.00	14.40	19.00	18.00	18.00	na	na	23.25	32.62
Chinese Exports	13.63	15.37	10.28	6.00	12.49	32.49	25.77	29.95	24.78	19.81	24.43	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 6c: Foreign Sales and Foreign Sales-Total Sales Ratios for Large Japanese Firms, Consolidated Accounting

Indicator, Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Foreign Sales (US\$ billions)												
Nippon Steel	na	na	na	4.761	na	6.226	5.792	5.973	3.243	4.700	4.432	4.113
NKK	na	na	na	4.771	na	5.339	5.266	5.267	5.021	5.277	4.932	4.384
Sumitomo Metal I.	na	na	na	2.369	na	2.940	2.757	2.674	2.377	2.646	2.732	2.841
Kobe Steel	na	na	na	2.079	na	3.621	3.013	2.931	2.642	2.492	2.806	1.885
Kawasaki Steel	na	1.932	2.053	2.262	2.732	2.819	2.650	2.774	2.481	2.835	2.856	2.721
Hitachi Metals	na	na	na	0.806	na	1.176	0.885	0.882	0.886	1.165	1.276	0.983
Nisshin Steel	na	na	na	0.660	na	1.077	0.923	0.938	0.795	0.765	0.772	0.660
Daido Steel	na	na	na	na	na	na	na	na	na	na	0.350	na
Yodogawa Steel W.	na	na	na	na	na	0.415	0.346	0.389	0.312	0.335	0.333	0.369
Nippon Yakin K.	na	na	na	0.134	na	0.247	0.215	0.193	0.115	0.138	0.154	0.131
Kurimoto	na	na	na	na	na	na	na	na	na	na	na	na
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	na	na	na	na	na	0.084	0.149	0.134
Japan Steel Works	na	na	na	0.352	na	0.365	0.386	0.356	0.400	0.386	0.283	0.267
Toyo Kohan	na	na	na	na	na	na	na	0.121	0.100	0.128	0.144	0.143
Foreign Sales-Total Sales Ratios												
Nippon Steel	na	na	na	18.68	na	20.32	21.31	23.82	15.05	19.56	17.81	19.94
NKK	na	na	na	28.94	na	28.51	31.59	33.41	35.54	34.92	30.50	33.18
Sumitomo Metal I.	na	na	na	20.90	na	19.81	21.30	22.33	22.60	20.73	20.16	26.34
Kobe Steel	na	na	na	17.96	na	23.65	22.13	23.43	25.91	22.19	22.59	19.68
Kawasaki Steel	na	18.69	19.56	20.58	23.63	23.35	24.22	27.37	29.03	25.15	24.00	28.00
Hitachi Metals	na	na	na	21.91	na	24.20	21.96	23.11	26.30	28.04	29.41	30.03
Nisshin Steel	na	na	na	17.23	na	22.82	22.70	24.88	25.53	19.80	19.17	20.94
Daido Steel	na	na	na	na	na	na	na	na	na	na	10.21	na
Yodogawa Steel W.	na	na	na	na	na	22.92	21.81	26.10	26.06	24.28	23.92	31.84
Nippon Yakin K.	na	na	na	8.88	na	13.23	13.25	13.48	10.69	11.33	11.89	12.74
Kurimoto	na	na	na	na	na	na	na	na	na	na	na	na
Toa Steel Co., Ltd.	na	na	na	na	na	na	na	na	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	na	na	na	na	na	6.83	10.60	11.95
Japan Steel Works	na	na	na	23.88	na	29.88	29.37	28.66	37.56	34.40	26.11	25.30
Toyo Kohan	na	na	na	na	na	na	na	11.24	10.91	12.44	14.17	18.57

Sources: See Appendix Tables 9a, 9b.

Appendix Table 7: Asian and North American Shares of Exports or Foreign Sales (percent)

Company	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Asian Shares of Exports from Northeast Asian Countries												
Japan	65.01	68.87	70.96	75.56	73.47	78.37	77.40	75.17	61.26	74.26	77.16	75.30
Korea	69.73	74.78	78.66	85.47	81.98	82.82	81.85	80.68	61.98	68.77	67.13	69.54
Taiwan	68.75	70.24	78.97	85.37	80.38	81.43	82.17	84.01	73.00	77.03	74.62	83.38
China	87.29	90.41	86.12	80.16	79.37	82.28	78.41	80.96	61.43	66.22	68.34	66.38
Asian Shares of Foreign sales in Large Japanese Firms, consolidated accounting												
Nippon Steel	na	na	na	na	na	na	na	na	50.00	64.47	65.87	67.42
NKK	na	na	na	na	na	na	na	na	na	na	na	na
Sumitomo Metal I.	na	na	na	na	na	na	na	na	na	56.07	55.71	55.44
Kobe Steel	na	na	na	na	na	na	na	54.34	42.07	56.00	55.72	52.25
Kawasaki Steel	na	na	na	na	na	na	na	na	na	62.49	64.09	61.97
Asian Shares of Foreign Sales in Pohang Steel, non-consolidated accounting												
Pohang Steel	na	na	na	na	na	na	na	na	na	69.58	76.95	70.40
Asian Shares of Foreign sales in China Steel, non-consolidated accounting												
China Steel	na	na	99.18	99.45	na	99.30	na	na	na	na	93.36	95.79
North American Shares of Exports from Northeast Asian Countries												
Japan	20.61	17.64	16.70	12.21	15.71	11.45	12.20	13.84	25.71	15.20	13.84	13.38
Korea	19.93	16.91	14.95	10.19	14.19	12.47	12.94	13.91	22.15	20.15	20.82	18.23
Taiwan	19.04	14.89	10.17	8.37	13.42	8.87	8.44	9.36	11.39	14.73	16.36	9.52
China	6.27	5.16	6.65	9.87	8.43	6.51	11.44	9.06	17.22	16.85	17.50	16.29
North American Shares of Foreign sales in Large Japanese Firms, consolidated accounting												
Nippon Steel	na	na	na	na	na	na	na	na	na	na	na	na
NKK	na	na	na	na	na	na	na	62.79	64.68	58.45	61.70	57.84
Sumitomo Metal I.	na	na	na	na	na	na	na	na	na	na	na	na
Kobe Steel	na	na	na	na	na	na	na	na	na	na	na	na
Kawasaki Steel	na	na	na	na	na	na	na	na	na	na	na	na
North American Shares of Foreign Sales in Pohang Steel, non-consolidated accounting												
Pohang Steel	na	na	na	na	na	na	na	na	na	20.48	12.82	10.74
North American Shares of Foreign sales in China Steel, non-consolidated accounting												
China Steel	na	na	na	na	na	na	na	na	na	na	na	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 8a: Total Liability-Total Asset Ratios, Non-consolidated Accounting (percent)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	73.90	72.36	72.20	72.92	72.75	73.86	72.34	72.22	72.61	71.70	70.07	72.06
Nippon Steel	73.57	72.91	73.23	73.95	74.20	73.26	73.18	72.64	74.31	72.29	69.95	71.03
NKK	79.47	78.79	80.36	81.54	81.56	76.89	75.43	76.53	80.10	78.05	78.25	78.83
Sumitomo Metal I.	73.05	73.58	74.22	75.20	75.90	74.90	74.44	74.79	75.93	78.48	77.40	81.23
Kobe Steel	78.65	78.77	79.71	79.44	83.47	78.76	76.98	77.22	78.41	77.82	79.81	79.51
Kawasaki Steel	68.94	69.07	70.42	72.16	73.46	73.16	72.00	72.22	72.88	69.43	68.36	73.34
Hitachi Metals	60.52	57.80	58.55	55.80	56.58	56.72	56.27	55.39	56.68	60.65	58.51	60.52
Nisshin Steel	62.53	62.89	65.06	61.68	61.23	59.55	58.76	60.21	60.38	60.96	57.98	61.07
Daido Steel	71.80	73.05	72.46	73.95	72.55	70.64	67.26	65.70	66.09	64.15	60.22	58.03
Yodogawa Steel W.	58.23	50.29	46.73	51.59	45.58	46.75	39.84	29.38	32.24	32.50	31.09	24.60
Nippon Yakin K.	69.94	68.24	69.09	69.95	72.43	75.10	77.21	77.96	81.63	83.93	75.19	76.12
Kurimoto	57.70	49.39	49.26	47.71	47.74	49.57	49.79	46.14	43.12	43.78	44.68	44.94
Toa Steel Co., Ltd.	67.61	64.30	67.30	64.94	76.08	79.59	81.48	85.89	na	na	na	na
Tokyo Steel Mfg.	45.09	41.22	32.24	28.63	32.57	35.16	35.54	37.20	21.42	24.86	24.89	23.92
Aichi Steel	45.37	43.58	43.66	43.46	43.52	45.33	44.49	42.66	39.72	39.62	39.51	36.48
Japan Steel Works	75.27	73.81	73.14	69.75	68.86	70.64	69.50	69.51	68.74	74.38	73.65	72.64
Toyo Kohan	66.18	65.72	62.13	60.59	60.85	63.90	64.00	62.41	58.91	55.73	53.13	48.51
All Korean Firms	59.45	63.17	65.62	64.93	65.98	na	67.75	72.51	66.99	65.91	64.77	na
Pohang Steel	53.58	56.09	58.95	56.40	57.59	53.80	53.59	58.43	53.24	47.25	46.92	42.12
INI Steel	53.58	58.45	60.30	62.63	65.85	66.57	67.48	72.45	62.61	54.26	65.73	61.41
Kang Won Ind.	56.78	59.25	61.47	65.90	69.88	71.85	80.63	68.63	73.15	na	na	na
Dongkuk	48.82	56.87	61.68	59.90	57.24	61.54	68.03	78.40	70.54	56.88	64.42	59.55
Dongbu	76.35	72.56	74.42	69.89	69.91	69.78	52.83	68.28	77.71	67.84	67.52	67.86
Hyundai Hysco	52.36	64.02	66.35	70.42	70.79	71.90	71.83	87.49	79.71	61.24	61.63	59.88
All Taiwanese Firms	na	na	na	na	na	na	na	na	na	na	na	na
China Steel	na	na	na	na	26.60	36.52	40.05	40.10	32.03	34.50	32.78	31.80
All Chinese Firms	na	na	na	na	58.77	56.76	55.97	na	59.45	na	57.01	na
Baosteel Group	na	na	na	na	na	na	na	na	na	65.79	51.71	na
Shanghai Steel Pl.	na	na	na	na	70.45	67.55	65.40	64.73	na	na	na	na
Baoshan	na	na	na	na	22.34	24.31	28.56	32.31	36.77	36.41	35.12	na
Shanghai Meishan	na	na	na	na	59.70	61.50	54.03	57.40	62.50	84.19	85.57	na
Shougang	na	na	na	na	66.86	29.95	50.53	52.64	51.77	49.30	44.65	na
Anshan	na	na	na	na	66.94	64.75	48.81	45.85	48.04	51.74	52.25	na
Wuhan	na	na	na	na	61.77	53.25	54.09	55.88	57.15	54.00	54.30	na
Panzhuhua	na	na	na	na	72.54	70.76	67.54	72.10	67.28	66.56	66.26	na
Baotou	na	na	na	na	48.02	50.25	52.89	53.94	58.64	60.54	51.52	na
Taiyuan	na	na	na	na	54.87	52.67	49.45	51.10	56.34	55.65	58.15	na
Benxi	na	na	na	na	55.78	64.46	60.51	66.41	64.34	64.59	65.64	na
Maanshan	na	na	na	na	na	na	na	na	na	na	50.76	na
Maanshan Magang	na	na	na	na	na	32.81	na	na	na	na	na	na
Maanshan Ir, & St,	na	na	na	na	33.58	20.76	36.86	35.43	35.56	34.59	na	na
Hunan Hualing	na	na	na	na	na	na	na	72.10	52.84	57.57	56.13	na
Xiangtan	na	na	na	na	34.78	35.16	46.63	na	na	56.27	54.93	na
Lianyuan	na	na	na	na	na	na	49.56	na	na	80.46	54.31	na
Hengyang	na	na	na	na	na	na	83.32	na	na	85.22	47.94	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 8b: Current Liability-Total Asset Ratios, Non-consolidated Accounting (percent)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Japanese Firms	43.57	42.21	38.42	37.78	37.90	40.38	40.37	39.38	33.97	34.94	34.64	37.62
Nippon Steel	38.98	43.27	38.96	33.88	34.67	33.65	34.34	33.52	29.34	28.56	31.04	34.50
NKK	46.99	47.66	40.32	38.39	40.99	41.08	39.43	41.46	39.43	34.17	31.51	35.89
Sumitomo Metal I.	36.69	39.18	32.05	34.98	36.38	40.75	37.09	34.42	25.13	24.36	27.12	32.90
Kobe Steel	42.41	41.17	38.30	41.82	44.70	43.29	42.85	44.79	37.99	32.57	31.71	35.78
Kawasaki Steel	35.71	32.92	31.17	34.32	24.64	24.18	25.18	23.23	23.97	21.95	25.30	26.64
Hitachi Metals	28.80	24.75	31.57	27.40	23.21	24.85	28.45	30.58	18.63	22.08	32.67	26.54
Nisshin Steel	30.16	30.72	35.72	33.03	35.17	35.85	39.98	36.19	32.85	32.13	31.94	31.81
Daido Steel	41.22	36.83	36.55	36.28	33.90	45.09	48.41	43.00	39.17	36.58	34.98	37.16
Yodogawa Steel W.	40.24	30.09	25.64	27.56	20.95	28.85	35.23	24.67	20.32	20.28	23.77	19.84
Nippon Yakin K.	43.72	36.24	42.02	36.79	43.41	59.74	60.30	52.36	60.61	67.24	54.15	60.82
Kurimoto	39.20	39.71	39.61	37.51	37.77	40.41	40.48	37.92	28.62	29.76	29.87	32.01
Toa Steel Co., Ltd.	49.93	40.38	41.64	25.34	35.58	48.01	34.69	38.77	na	na	na	na
Tokyo Steel Mfg.	29.07	31.13	21.89	16.74	20.61	24.05	23.84	35.14	18.64	20.34	20.36	18.34
Aichi Steel	26.59	22.96	23.72	18.02	18.65	21.20	27.39	35.60	14.61	15.02	19.09	18.67
Japan Steel Works	62.76	59.90	54.13	47.01	49.72	50.39	47.30	45.22	41.75	50.78	45.32	47.99
Toyo Kohan	52.35	44.85	41.77	39.49	36.72	33.36	38.11	38.11	35.70	36.04	37.81	35.90
All Korean Firms	29.37	31.27	32.56	35.86	36.34	na	38.97	38.93	32.83	23.16	27.68	na
Pohang Steel	20.54	20.95	20.50	24.99	23.33	22.98	23.50	23.23	19.97	17.38	19.76	12.79
INI Steel	38.68	37.00	41.04	50.38	48.52	50.47	53.15	48.05	27.32	31.62	35.23	30.49
Kang Won Ind.	24.41	34.25	33.72	31.41	39.01	41.82	54.73	38.96	44.17	na	na	na
Dongkuk	31.76	34.82	33.84	39.37	45.44	51.26	59.15	47.56	34.55	25.76	42.40	43.27
Dongbu	23.69	25.84	33.16	25.18	35.85	42.86	25.85	37.75	31.46	32.44	44.91	42.15
Hyundai Hysco	46.75	50.60	48.38	51.51	58.40	62.37	51.71	56.35	33.43	33.26	37.86	27.08
All Taiwanese Firms	na	na	na	na	na	na	na	na	na	na	na	na
China Steel	na	na	na	na	20.05	24.21	24.33	25.30	14.20	13.45	14.28	12.87
All Chinese Firms	na	na	na	na	44.08	42.34	40.99	na	40.78	na	39.56	na
Baosteel Group	na	na	na	na	na	na	na	na	na	37.50	35.03	na
Shanghai Steel Pl.	na	na	na	na	56.73	53.58	51.45	49.06	na	na	na	na
Baoshan	na	na	na	na	18.19	19.00	19.92	19.13	21.05	17.19	20.11	na
Shanghai Meishan	na	na	na	na	57.13	58.33	51.11	52.14	56.55	44.47	52.65	na
Shougang	na	na	na	na	46.10	13.77	38.71	40.02	37.75	36.98	37.57	na
Anshan	na	na	na	na	51.19	56.06	41.84	38.05	32.27	29.33	33.70	na
Wuhan	na	na	na	na	39.70	30.79	30.59	32.38	32.57	33.95	34.31	na
Panzhihua	na	na	na	na	45.04	50.77	43.20	33.28	35.40	33.18	37.17	na
Baotou	na	na	na	na	31.56	28.76	29.96	28.42	42.11	38.03	31.93	na
Taiyuan	na	na	na	na	44.54	45.86	36.40	34.54	32.97	28.79	32.13	na
Benxi	na	na	na	na	45.61	40.75	34.35	38.69	31.96	30.53	33.97	na
Maanshan	na	na	na	na	na	na	na	na	na	na	28.42	na
Maanshan Magang	na	na	na	na	na	27.16	na	na	na	na	na	na
Maanshan Ir, & St,	na	na	na	na	24.71	15.10	27.59	25.82	26.81	25.72	na	na
Hunan Hualing	na	na	na	na	na	na	na	33.28	39.53	37.60	38.16	na
Xiangtan	na	na	na	na	27.87	25.81	30.73	na	na	40.33	37.83	na
Lianyuan	na	na	na	na	na	na	43.92	na	na	49.63	28.47	na
Hengyang	na	na	na	na	na	na	45.65	na	na	40.85	38.25	na

Sources: See Appendix Tables 9a, 9b.

Appendix Table 8c: Debt Indicators for Large Japanese Firms, Consolidated Accounting (percent)

Indicator, Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total Liability-Asset Ratios, All Operations												
Nippon Steel	75.20	75.28	75.46	76.50	79.40	78.63	78.93	80.03	79.31	77.25	75.35	75.87
NKK	82.66	83.20	83.70	85.58	85.38	81.05	79.64	81.07	84.64	86.32	83.09	84.56
Sumitomo Metal I.	76.91	77.54	77.86	76.03	78.39	77.70	76.56	77.31	80.51	85.96	84.79	86.61
Kobe Steel	81.76	82.25	83.70	83.87	87.90	84.03	82.99	83.58	84.36	86.72	86.24	84.98
Kawasaki Steel	70.00	70.38	73.62	75.70	77.57	77.33	76.67	76.87	80.17	83.88	84.54	83.51
Hitachi Metals	64.62	62.44	63.11	61.07	62.38	60.71	60.81	61.75	63.38	65.97	63.32	63.27
Nisshin Steel	62.49	62.77	65.19	61.35	61.27	59.39	58.79	59.95	60.09	62.01	59.76	62.00
Daido Steel	73.12	73.19	71.91	73.76	72.59	70.91	68.69	67.88	68.31	67.44	65.33	62.84
Yodogawa Steel W.	57.69	49.76	46.16	52.35	45.87	46.69	39.73	29.26	31.59	34.51	35.52	29.96
Nippon Yakin K.	76.80	74.81	75.29	76.36	79.88	82.35	84.96	86.57	91.82	94.32	85.47	86.39
Kurimoto	59.21	51.72	51.44	49.81	49.72	51.57	51.65	48.21	45.45	44.86	47.37	47.78
Toa Steel Co., Ltd.	na	na	67.56	65.22	77.04	80.78	82.35	86.55	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	44.73	45.47	44.60	43.56	40.73	41.54	41.14	37.89
Japan Steel Works	76.82	75.27	74.08	70.71	69.71	71.58	70.18	70.06	68.99	74.15	73.76	72.35
Toyo Kohan	68.18	67.42	64.02	62.40	63.05	65.73	65.56	63.73	62.61	59.48	58.18	53.50
Current Liability-Total Asset Ratios, All Operations												
Nippon Steel	39.68	43.80	40.98	38.96	41.92	40.61	40.92	42.98	39.54	39.29	40.44	43.26
NKK	45.53	49.16	42.97	41.76	46.20	44.95	43.24	43.94	44.64	42.68	37.48	43.15
Sumitomo Metal I.	45.02	46.40	40.09	35.86	38.79	42.98	39.83	39.92	32.64	38.02	39.41	45.02
Kobe Steel	45.98	45.33	43.14	45.90	48.20	47.29	45.83	49.17	42.36	40.51	40.51	40.98
Kawasaki Steel	38.34	35.43	35.54	38.24	30.92	30.55	32.15	31.60	31.35	33.16	35.96	32.04
Hitachi Metals	34.76	31.67	37.16	34.19	31.92	30.06	33.13	38.01	28.23	31.13	38.36	32.76
Nisshin Steel	30.52	30.76	34.60	32.23	35.77	35.79	39.39	35.63	32.88	34.99	34.66	34.42
Daido Steel	47.39	42.46	41.12	40.22	38.96	46.95	50.69	47.30	43.31	43.48	42.09	42.26
Yodogawa Steel W.	39.89	29.78	25.32	28.09	20.51	28.12	33.73	23.61	19.31	22.84	25.76	22.04
Nippon Yakin K.	55.81	48.84	53.01	49.65	55.68	67.51	69.45	64.94	71.67	78.35	66.30	72.07
Kurimoto	41.59	42.26	42.04	39.88	40.21	43.01	42.96	40.54	31.83	31.45	32.32	34.56
Toa Steel Co., Ltd.	na	na	42.32	26.36	36.30	49.14	35.98	40.46	na	na	na	na
Tokyo Steel Mfg.	na	na	na	na	na	na	na	na	na	na	na	na
Aichi Steel	na	na	na	na	20.55	21.59	27.70	36.53	16.40	16.74	20.03	19.45
Japan Steel Works	64.44	61.54	55.29	48.40	50.94	51.96	48.16	46.14	42.23	50.98	45.43	47.28
Toyo Kohan	55.33	48.05	45.18	42.82	40.70	37.77	41.13	41.04	38.06	38.33	40.94	38.59

Sources: See Appendix Tables 9a, 9b.

Appendix Table 9a: Data Sources (for Company Websites see Appendix Table 9b)

Text Table	Appendix Tables	Firm, Group of Firms, or Indicator	Source(s)
1	1a, 1b	All Japanese Firms	Ministry of Finance (various years)
1	1a, 1b	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
1	1a, 1b	All Korean Firms	Bank of Korea (various years); National Statistical Office (various years)
1	1a, 1b	Korean Firms	Asia-Pacific Infoserv (various years a, various years b); Business Korea (various years) Saturn Communications (various years a, various years b); Toyo Keizai (various years); Company Websites
1	1a, 1b	All Taiwanese Firms	Directorate General of Budget, Accounting and Statistics (1993, 1998)
1	1a, 1b	Taiwanese Firms	China Credit Information Service (various years); Toyo Keizai (various years); Company Websites
1	1a, 1b	All Chinese Firms, Chinese Firms	Ministry of Metallurgical Industry of China (various years); Company Websites
na	1c, 1d	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
1	1a, 1c	Exchange Rates	International Monetary Fund (2002)
2	2a, 2b	All Japanese Firms	Ministry of Finance (various years)
2	2a, 2b	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
2	2a, 2b	All Korean Firms	Bank of Korea (various years); National Statistical Office (various years)
2	2a, 2b	Korean Firms	Asia-Pacific Infoserv (various years a, various years b); Business Korea (various years) Saturn Communications (various years a, various years b); Toyo Keizai (various years); Company Websites
2	2a, 2b	Taiwanese Firms	China Credit Information Service (various years); Toyo Keizai (various years); Company Websites
2	2a, 2b	All Chinese Firms, Chinese Firms	Ministry of Metallurgical Industry of China (various years); Company Websites
na	2c	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
3	3a, 3b	All Japanese Firms	Ministry of Finance (various years)
3	3a, 3b	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
3	3a, 3b	All Korean Firms	Bank of Korea (various years); National Statistical Office (various years)
3	3a, 3b	Korean Firms	Asia-Pacific Infoserv (various years a, various years b); Business Korea (various years) Saturn Communications (various years a, various years b); Toyo Keizai (various years); Company Websites
3	3a, 3b	Taiwanese Firms	China Credit Information Service (various years); Toyo Keizai (various years); Company Websites
3	3a, 3b	All Chinese Firms, Chinese Firms	Ministry of Metallurgical Industry of China (various years); Company Websites
na	3c	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
3	3a, 3c	Exchange Rates	International Monetary Fund (2002)
4	4	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
4	4	Exchange Rates	International Monetary Fund (2002)

Appendix Table 9a: Data Sources (for Company Websites see Appendix Table 9b)

Text Table	Appendix Tables	Firm, Group of Firms, or Indicator	Source(s)
5	5a, 5b	All Japanese Firms	Ministry of Finance (various years)
5	5a, 5b	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
5	5a, 5b	All Korean Firms	Bank of Korea (various years); National Statistical Office (various years)
5	5a, 5b	Korean Firms	Asia-Pacific Infoserv (various years a, various years b); Business Korea (various years) Saturn Communications (various years a, various years b); Toyo Keizai (various years); Company Websites
5	5a, 5b	Taiwanese Firms	China Credit Information Service (various years); Toyo Keizai (various years); Company Websites
5	5a, 5b	All Chinese Firms, Chinese Firms	Ministry of Metallurgical Industry of China (various years); Company Websites
na	5c	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
5	5a, 5b, 5c	Exchange Rates	International Monetary Fund (2002)
6	6a, 6b	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
6	6a, 6b	Korean Firms	Asia-Pacific Infoserv (various years a, various years b); Business Korea (various years) Saturn Communications (various years a, various years b); Toyo Keizai (various years); Company Websites
6	6a, 6b	Taiwanese Firms	Toyo Keizai (various years); Company Websites
na	6c	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
6	6a	Country Exports	Organisation for Economic Cooperation and Development (2002); Statistics Canada (2002);
6	6b	Country Export-Sales Ratios	Country Export Sources from Appendix Table 6a and Country Sales Sources from Appendix Table 1a.
6	6a, 6c	Exchange Rates	International Monetary Fund (2002)
7	7	Country Exports	Organisation for Economic Cooperation and Development (2002); Statistics Canada (2002);
7	7	Japanese Firms	Company Websites
7	7	Korean Firms	Company Websites
7	7	Taiwanese Firms	Toyo Keizai (various years); Company Websites
8	8a, 8b	All Japanese Firms	Ministry of Finance (various years)
8	8a, 8b	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
8	8a, 8b	All Korean Firms	Bank of Korea (various years); National Statistical Office (various years)
8	8a, 8b	Korean Firms	Asia-Pacific Infoserv (various years a, various years b); Business Korea (various years) Saturn Communications (various years a, various years b); Toyo Keizai (various years); Company Websites
8	8a, 8b	Taiwanese Firms	China Credit Information Service (various years); Toyo Keizai (various years); Company Websites
8	8a, 8b	All Chinese Firms, Chinese Firms	Ministry of Metallurgical Industry of China (various years); Company Websites
na	8c	Japanese Firms	Nihon Keizai Shinbunsha (2001, 2002, various years); Company Websites
8	8a, 8c	Exchange Rates	International Monetary Fund (2002)

Appendix Table 9b: Company Websites

Company	Website
Japanese Firms	
Nippon Steel	www.nsc.co.jp
NKK	www.nkk.co.jp
Sumitomo Metal Industries	www.sumitomometals.co.jp
Kobe Steel	www.kobelco.co.jp
Kawasaki Steel	www.kawasaki-steel.co.jp
Hitachi Metals	www.hitachi-metals.co.jp
Nisshin Steel	www.nisshin-steel.co.jp
Daido Steel	www.daido.co.jp
Yodogawa Steel Works	www.yodoko.co.jp
Nippon Yakin Kogyo	www.nyk.co.jp
Kurimoto	www.kurimoto.co.jp
Toa Steel Co., Ltd.	na
Tokyo Steel Manufacturing	www.tokyosteel.co.jp
Aichi Steel	www.aichi-steel.co.jp
Japan Steel Works	www.jsw.co.jp
Toyo Kohan	www.toyokohan.co.jp
Korean Firms	
Pohang	www.posco.co.kr
INI Steel	www.inisteel.co.kr/
Kang Won Ind.	na
Dongkuk	www.dongkuk.co.kr/
Dongbu	www.dongbu.co.kr
Hyundai Hysco	www.hysco.com/
Taiwanese Firms	
China Steel	www.csc.com.tw/
Yieh United Steel	www.yusco.com.tw/
Chinese Firms	
All Chinese Firms	na
Shanghai-Baoshan	www.baosteel.com
Shanghai Steel Plants	na
Baoshan	na
Shanghai Meishan	na
Shougang	www.shougang.com.cn/
Anshan	na
Wuhan	www.wisco.com.cn/
Panzhuhua	na
Baotou	www.btsteel.com.cn/
Taiyuan	www.china-steeleng.com/
Benxi	www.bxsteel.com.cn/
Maanshan	www.magang.com.cn
Maanshan Magang	na
Maanshan Iron & Steel	na
Hunan Hualing	na
Xiangtan	www.hnxg.com.cn/
Lianyuan	na
Hengyang	www.hysteeltube.com/indexe.htm