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Rating Methodology by Sector

General Heavy Machinery

1. Business base

General heavy machinery companies operate diverse businesses with a wide range of products. Due to the varying nature of the delivery terms, profitability, and business risks, such as business volatility, related to each business, the assessment for assigning a rating focuses on the portfolio analysis of their core businesses.

(1) Characteristics of the industry

(i) Market overview

The businesses of general heavy machinery companies are associated primarily with social infrastructure, transportation equipment, and companies' production facilities.

JCR first identifies each company's core businesses and analyzes the markets for them, along with those of related businesses, from a multifaceted perspective, including responsiveness to economic trends, such as demand volatility and business cycle time lags; growth potential; regional characteristics, such as domestic vs. international; customer attributes, such as private vs. public and large customized orders vs. mass production; and competitive situation. The latter is described later in Section (2).

Social infrastructure, for instance, is broadly divided into overseas large-scale projects and domestic public works projects (governmental demand). The former is expected to be led by demand for power generation plants to meet the growing demand for electric power largely in emerging countries. Numerous high-speed rail projects have been planned and considered both in developed and emerging countries, and this trend is likely to continue. Demand for public works projects in Japan, including for bridges and waste disposal facilities, has declined, reflecting severe financial conditions. Considering safety and environmental concerns, however, a certain level of demand for reconstruction projects is expected to remain. Both overseas projects and domestic public works projects are relatively unlikely to be affected by business fluctuations, due to the nature of infrastructure business.

(ii) Competitive situation

Competition is an important factor having a significant effect on earnings. JCR observes competitive conditions and their effects on each business.

Most businesses face intense competition in a free competitive market, but some lay claim to unique aspects. Large international projects, including power plants and high-speed rail, for instance,

are joined by new competitors, including those from South Korea, which add to the competition. In some cases, conventional free competition has been shifting to cooperation between companies and their governments in recent years. Together with future trends, JCR monitors each company's responses and trends in orders received. Meanwhile, defense-related businesses, such as fighter planes and warships, of which suppliers are limited, often use private contracts, reducing the competition in comparison to former years (see details in a following section).

(iii) Cost structure

As acceptance of orders is normally made based on cost consideration, it is probable to recover invested capital and securing earnings. As exemplified by shipbuilding, however raw materials and mechanical equipment make up the major portion in cost structure. Time lags between the supply of such materials and the acceptance of orders sometimes make gap between planned cost and actual cost, which is a risk for profitability. The production of many goods sold in international markets has been difficult to shift overseas, inevitably exposing companies to the risks of foreign exchange rates that result in unbalanced sales and costs. For each issuer, JCR identifies the level of risk by examining the sensitivity of earnings to such risks as well as actual responses to them, such as hedging transaction exposure.

Special note should be taken of aircraft-related businesses, which vary between governmental demand and private demand. The segment for governmental demand commonly uses private contracts based on "cost plus fees," which are less likely to involve risk and considered a stable income source. For private demand, on the other hand, both commodities and completed aircrafts require advance payments of a reasonable amount of development expenses and capital expenditure. Deficit inevitably precedes sales, and the recovery of invested capital becomes difficult unless a certain amount of orders for the aircraft is received. JCR does not consider the initial deficit in the development of private aircraft a negative factor, and it determines a project's medium- and long-term contribution to earnings as well as the probability of recovery of invested capital for each time, while updating the prospects of demand for air transportation and the aircraft concerned.

(2) Key factors in market position and competitiveness

(i) Market position

In view of market position, the businesses of general heavy machinery companies can be broadly divided into (a) those in the position of being "a big player" and (b) one of many similar companies. Although even those in the latter group may have certain earning power, JCR focuses more on the conditions of businesses in the former group (mostly core businesses) to survey the strength of a business base.

The former group consists of, though limited, those businesses that fiercely compete against other big players, such as those involved in making power plants, railway cars, and motorcycles, and

businesses that have established virtually exclusive positions based on their strong relationships with specific customers, such as those involved in making aircraft components and defense-related materials. There are still businesses, such as chemical plants and industrial machinery, that are not necessarily big players but have established certain positions in their specialty areas or product markets. In all cases, JCR identifies the trends in demand of regular and potential customers and monitors the status of orders received and products delivered, which are key to acquiring customers and improving relationships with them.

Group (b) includes shipbuilding and public facilities. Any advantage based on economies of scale is effectively nonexistent, and every decline in demand makes business operation more difficult. There are nonetheless companies that enjoy the resulting benefits of being a survivor in a difficult industry. JCR is currently surveying the future direction of such companies' earnings, including the status of their businesses.

(ii) Technical strengths

The majority of general heavy machinery products require advanced technologies, including that for safety. These companies are also striving to improve their competitiveness by differentiating their products using value-added features, such as high efficiency and reduced CO_2 emissions. In addition, the development and use of advanced technologies are essential, not only to respond to customer needs, but also to develop new markets. New competitors, including those from South Korea, have also been rapidly improving their technologies, and ensuring technological advantage is the basis of competitiveness in the general heavy machinery business. Taking into account past business performance, JCR attempts as much as possible to understand the technological positions of the core businesses of each company.

(iii) Cost-competitiveness

Cost-competitiveness, in a sense, can be paired with technical strengths. Regardless of the superiority of product performance, a price higher than its perceived value makes it difficult to win the competition for orders. South Korean and other manufacturers traditionally tend to promote their price advantage, and Japanese manufacturers are placed in a particularly difficult situation when the yen is high.

While most general heavy machinery companies must pay a large amount of depreciation and other fixed costs, room for cost reduction, including productivity improvement, can still be found. Optimization of material procurement, including the use of global suppliers; rationalization of product inventory management, including distribution and inventory; and standardization and modularization of components that are often customized are also effective. Depending on the trends in supply and demand, the location of production bases may be a matter to consider. JCR examines each company's responses, their effectiveness, and future directions.

(iv) Project management capacity

Plants and high-speed rail systems involve high risks as a business, and an extremely large amount of loss has been incurred in some cases in the past. Due to the large size, even a single project may seriously affect corporate management, which makes the project management capacity extremely important.

Accurate and appropriate decisions and responses are required in a wide range of aspects, including country risks, cost estimates, contract terms and conditions, material prices, exchange rate fluctuations, project progress management, and recovery of invested capital. Companies also need to respond to increasing customer needs, such as those pertaining to construction projects, operations, and after-sale maintenance. JCR observes each company's efforts in risk management, in other words, specific steps in risk management at each level as described earlier.

(v) Business portfolio

In the analysis of each company's business portfolio, JCR focuses on the lengths of time required to meet delivery deadlines. Sales of products which require long period to delivery are generally recorded according to their progress for several years. Earnings of such products tend to lag behind fluctuating economic trends, and are relatively stable. Conversely, businesses requiring only a short time lag before products enter mass production can be sensitive to fluctuating economic trends and have a wide range of earnings. Both cases require continuously received orders and a certain balance from orders received to ensure certain earnings. JCR determines the earnings' probability based on the conditions of the market of each business and each company's competitiveness as described so far.

Companies whose long-term core businesses have competitive advantages and represent a large portion of their business portfolios are positively rated. In contrast, for short-term, mass-production businesses, JCR attempts to identify the level of medium-term average earnings and the range of fluctuation, rather than incorporating the short-term fluctuations of earnings in each rating. Large short-term fluctuations, however, are considered a risk. Based on such understanding, JCR analyzes the characteristics of business portfolios as a collection of businesses, i.e., the stability of earnings and the effect of risk diversification through the operation of multiple businesses.

Large mergers and acquisitions that have a major impact on business portfolios or entries into new markets, such as those for private aircrafts, become a significant step for growth while naturally involving corresponding risks. Such factors, however, are incorporated into a credit rating only when their impact in the medium-term, including their financial impact, has become clear in a certain extent.

2. Financial base

(1) Earnings strength

When assessing the earnings of general heavy machinery companies, caution must be used in regard to the timing of reported earnings based on the long periods required for delivery and the burden of advance investment in each business. Not only the conditions of the overall process, but also the status of each business (practical analysis is mainly based on each segment) must be observed with a consideration of time frames. Based on this, JCR emphasizes the contribution of each core businesses to earnings, along with its stability, as the most important point in establishing a credit rating.

Key financial indicators:

- Operating income
- Amount of orders received
- Balance of orders received
- Operating margin

(2) Cash flow

General heavy machinery businesses commonly record a large amount of depreciation expenses, which means that cash flow exceeds the profit in the income statement to a considerable extent. In view of the recovery of invested capital, JCR focuses on the analysis of the balance between interest-bearing debt and cash flow.

Key financial indicators:

- Ratio of interest-bearing debt to EBITDA

(3) Safety

In addition to the large amount of funds required for capital expenditure and research and development in general heavy machinery businesses, the long time lags involved in construction projects require a large amount of working capital, resulting in an increase in interest-bearing debt. Meanwhile, there are some companies whose equity capital may not necessarily be at an adequate level, due partly to losses incurred in the past. Considering the financing for future business development, risk of increasing interest rates, and business risks, the financial structure should be improved by reducing interest-bearing debt and increasing equity capital. JCR incorporates the actual improvements or directions into a company’s credit rating.

Key financial indicators:

- Debt equity ratio
- Equity ratio
- Shareholders’ equity
- Interest coverage ratio

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