



Economic Commentary

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Will Japanese Companies Achieve a Full-Fledged Recovery?

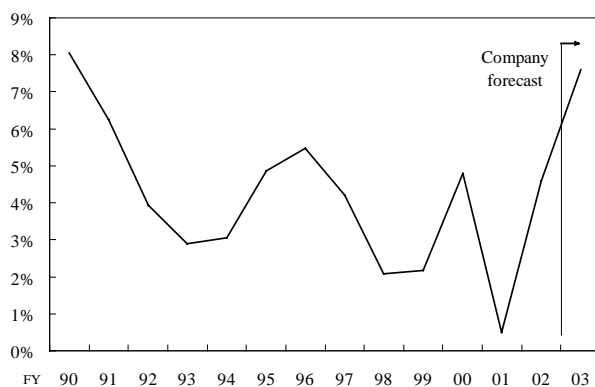
— Evaluating the financial improvement of the companies
 using the estimated equation for forecasting credit ratings —

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Why use “credit-ratings?”

The profitability of listed companies is recovering noticeably. According to data from 1,201 companies listed on the first section of the Tokyo Stock Exchange, for which data are continuously available from FY1990, the ROE (return on equity) for FY2003 is projected to reach the 7.5-percent level.¹ This is the highest level recorded since FY 1990, surpassing the past two cyclical peaks (Chart 1).

Chart 1: Developments in the ROE of Listed Companies



Notes: 1. Data based on 1,201 companies (of which 733 are manufacturing) listed in the first section of the Tokyo Stock Exchange (excluding financial institutions), which have been listed throughout fiscal 1990-2002. Data are basically on a consolidated basis, although some exist on a non-consolidated basis for those not released on a consolidated basis.

2. ROE = net income / shareholders' equity.
 Net income for FY2003 is based on company forecasts. Shareholders' equity is assumed to be unchanged from FY 2002.

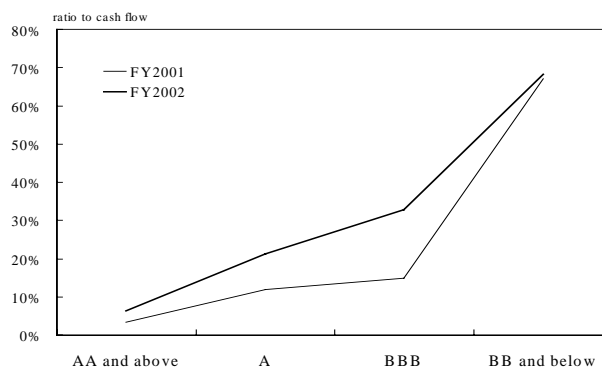
Source: Financial statements (projections for FY 2003 are based on recent company forecasts).

In comparison with the generated cash flow, however, it is true that the recovery in business fixed investment to date is still at a considerably low level. Various reasons can be given for this.² One is that, from the experience of the financial crisis in 1997-98, companies have put more emphasis on their fund-raising conditions, and hence they have placed priority on financial restructuring

to enhance their creditworthiness. One major indicator showing this creditworthiness is “credit ratings.”³ It is actually observed that the lower the credit rating of a company, the more the company tends to allocate its cash flow for debt reduction (Chart 2). This shows that credit ratings that reflect the creditworthiness of companies, and also their profitability and financial condition, are one way to measure whether the improvement in the risk-taking behavior of companies, such as business fixed investment, is becoming full-scale.

Using the following statistical method, we verify whether the profitability and the state of balance sheets of companies have reached the stage where they are consistent with the possible improvement of credit ratings.

Chart 2: Amount of Reduced Debt to Cash Flow



Notes: 1. Data based on 489 listed companies.

2. Cash flow = operating cash flow + amounts of fixed assets and securities sold.

Sources: Earnings reports of companies; R&I.

Overview of the estimated equation for forecasting credit ratings

An estimated equation is used to forecast credit ratings in this paper. Based on objective and quantitative information obtained from financial indicators, this

equation enables us to statistically estimate the credit rating of a company in the near future. Since actual credit rating agencies intensely analyze aspects such as management, technology, and the brand value of a company (factors that do not always appear in financial indicators), it is difficult to assign ratings precisely to each company using the above method. However, the changes in credit ratings on the whole can still be explained reasonably by a relatively small number of financial indicators.

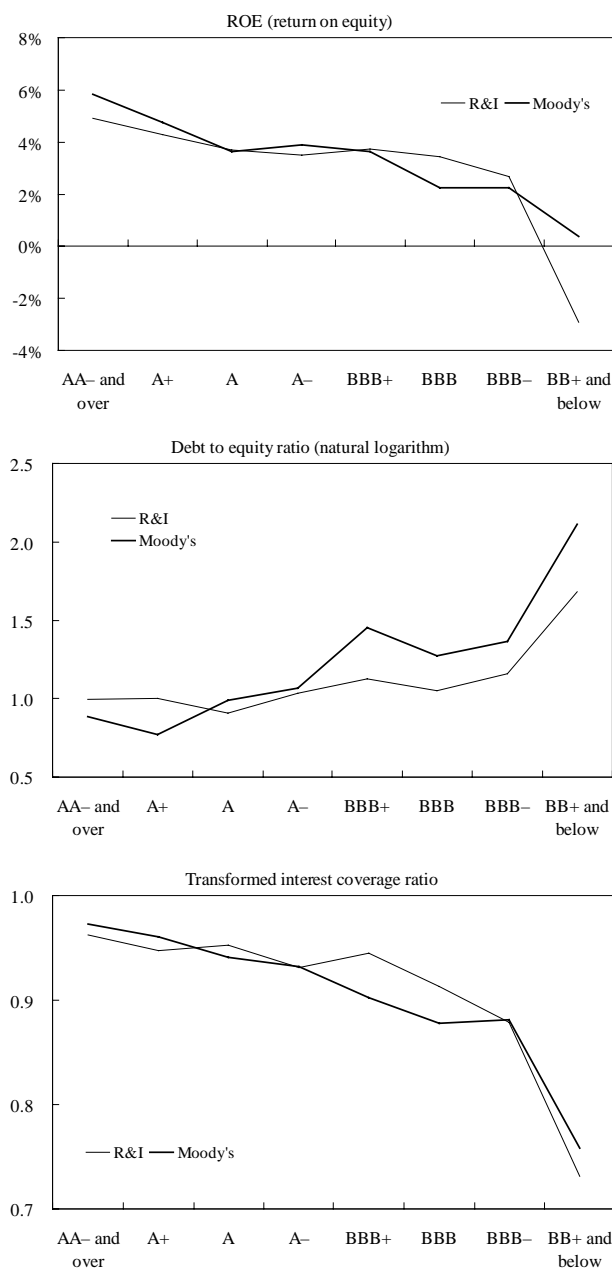
Financial indicators from fiscal 1995-2002 are used for almost all companies that have obtained a long-term debt rating either from Rating and Investment Information, Inc. (R&I hereafter) or from Moody's Investors Service Inc. (Moody's hereafter).⁴ The total number of samples (= number of companies * number of fiscal years) is 4,685 from R&I (3,031 in manufacturing and 1,654 in nonmanufacturing) and 1,579 from Moody's (1,187 in manufacturing and 392 in nonmanufacturing). Trials and errors have been repeated through combining various financial indicators. As a result, the combination of the following seven financial indicators turns out to be the most useful for forecasting credit ratings.⁵

- (1) ROE (= net income/shareholders' equity)
- (2) Debt to equity ratio (= interest-bearing liabilities/shareholders' equity)
- (3) Fixed assets to net worth ratio (= fixed assets/shareholders' equity)
- (4) Interest coverage ratio (= <net income + interest expense>/interest expense)
- (5) Absolute value of shareholders' equity
- (6) Absolute value of cash flow
- (7) Group-to-parent shareholders' equity ratio (= shareholders' equity on a consolidated basis/shareholders' equity on a non-consolidated basis)

Furthermore, the accuracy of the forecast is enhanced by the following three procedures.

(1) Use the average of the past three years for each of the above seven indicators. In fact, there is a distinct relationship between the average of some financial indicators over the past three years and the credit ratings (Chart 3). For instance, a temporary improvement in financial indicators is not sufficient grounds for a credit rating upgrade. This implies that companies are required to show favorable business results in succession to be upgraded.

Chart 3: Relationship between the Average of Financial Indicators over the Past Three Years and the Credit Ratings



Note: Transformed interest coverage ratio = $1/(1+\exp[\text{interest coverage ratio}])$

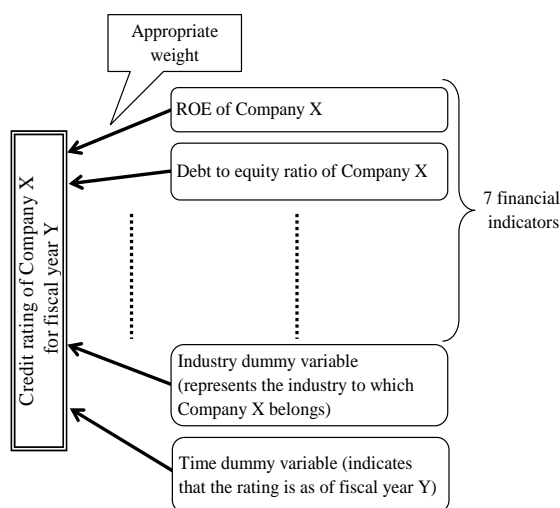
Sources: Financial statements; R&I; Moody's.

(2) Add "industry dummy variables" to capture industry characteristics. For example, industries such as trading houses and real estate always hold assets that can be sold off rather easily. In these industries, despite the high debt to equity ratio, financial risks are lower in most cases compared to other companies with the same debt to equity ratio. Industry dummy variables enable us to capture the possible inter-industry differences in impacts of the same financial indicators on the credit ratings.

(3) Add “time dummy variables” to capture the changes in the financial and economic environment from a macroeconomic perspective. When the financial and economic environment is severe from a macroeconomic perspective, financial risks rise for all companies. Time dummy variables capture these possible differences in the business environment according to the fiscal year common to all companies.

On estimating the equation for forecasting credit ratings, the ratings of companies are first classified into eight grades: “AA- and over”; “A+”; “A”; “A-;” “BBB+”; “BBB”; “BBB-”; and “BB+ and below.”⁶ Then the weights on the aforementioned variables, namely, the three year average of the seven financial indicators, industry dummy variables, and time dummy variables are estimated so that those variables can tell best to which of the above eight categories the grade of a company at a particular fiscal year belongs (Chart 4). A statistical method called the “multinomial logit model” is used to estimate these weights. When the level of absolute credit ratings differs, the relative significance of each variable may also differ.⁷ The variables are carefully weighted, taking these possibilities into account.

Chart 4: Structure of Estimated Equation for Forecasting Credit Ratings



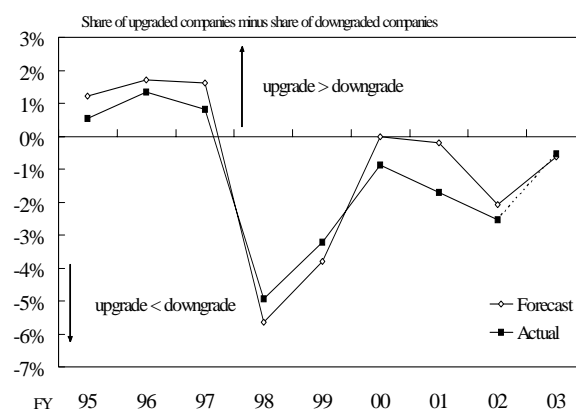
Relatively well-fitted equation

Let us call it a “hit” when the prediction error obtained from the estimated equation is within the range of plus/minus 1 grade of the eight grades. Then the “hit ratio” are 89.1 percent and 85.2 percent when using credit ratings of R&I and Moody’s respectively; a fairly high percentage.

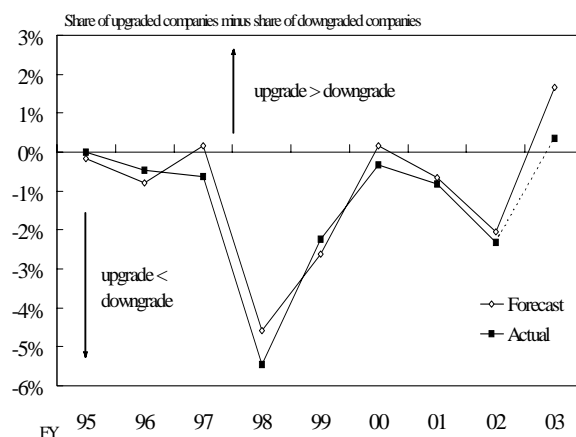
Moreover, the changes in credit ratings expressed as the “share of upgraded companies minus share of downgraded companies” of each fiscal year can be captured fairly well by the estimates obtained from the equation (Chart 5).

Chart 5: Application of the Estimated Equation for Forecasting Credit Ratings

(1) R&I



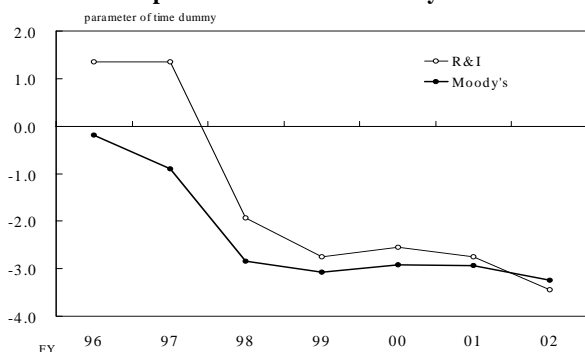
(2) Moody’s



Notes: 1. Forecasts are estimates obtained from the equation for forecasting credit ratings.
2. The dotted line indicates figures as of December end in 2003.

This “share of upgraded companies minus share of downgraded companies” has basically been negative in recent years; companies were downgraded on the whole. However, one notable characteristic is that companies were noticeably downgraded in FY1998. These developments in FY1998 are largely explained by time dummy variables common to all companies in the equation (Chart 6). This suggests that since the financial crisis of 1997-98, the capacity of main banks to support borrowers has been perceived as weaker than before. Therefore the default risk of corporate bonds has been recognized as more realistic than before.

Chart 6: Developments in the Time Dummy

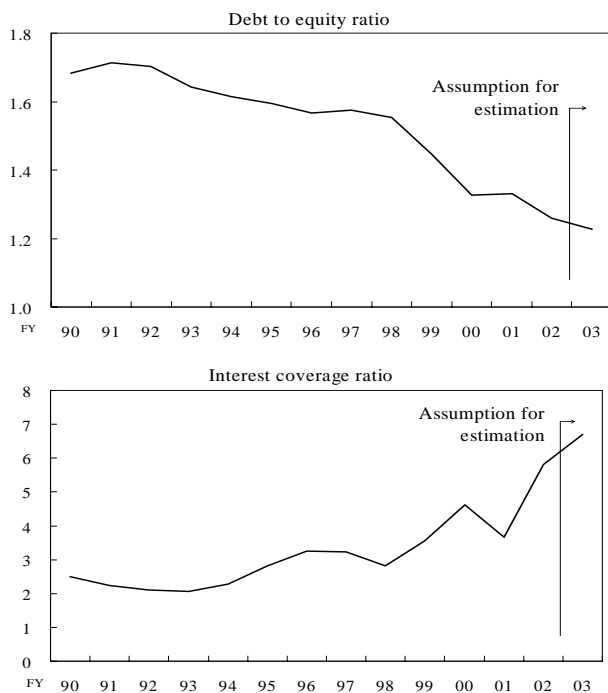


Note: Since there are parameters of the time dummy for each level of absolute ratings, the simple averages are shown here.

A gradual improvement in credit ratings

To estimate ratings for FY2004 using the equation, some assumptions are needed; the FY2003 figures of the aforementioned seven financial indicators and the time dummy variable of FY2004 are prepared based on the following assumptions. The time dummy variable is assumed to be unchanged since there is no good reason for predicting any changes. Forecasts by companies in Chart 1 will be used for the ROE in FY 2003. Basically, trends over the past two years will be extended for FY2003 figures other than the ROE. The figures for the debt to equity ratio and interest coverage ratio are indicated in Chart 7, showing that the recent recovery trend will continue to be gradual.⁸

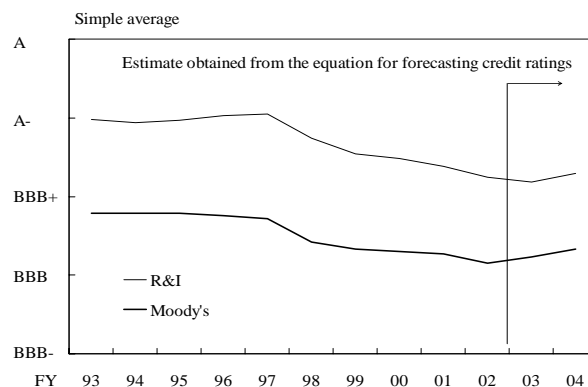
Chart 7: Developments in Major Financial Indicators



Note: See footnote in Chart 1 for surveyed companies.
Source: Financial Statements.

Based on the above assumption, the average credit rating of companies is estimated to improve gradually toward FY 2004 (Chart 8). This reflects that the improvement in profitability and balance sheets is not merely a short-term fluctuation, but rather a trend represented by the “moving average of the past three years.”

Chart 8: Forecast for the Average of Credit Ratings



Note: Excluding the effects from changes in coverage (newly assigned ratings and suspension of ratings).
Sources: R&I; Moody's.

Conclusion

In sum, companies have been putting efforts into financial restructuring, and the business environment, such as overseas economies, has been improving. These factors have facilitated improvements in profitability and the financial conditions of companies to the extent that credit ratings are anticipated to improve gradually. Restraints from the fund-raising environment on positive activities of companies such as business investment have been abating. However, the improvements in credit ratings estimated by the equation are very marginal. Therefore, improvements should be evaluated with caution when considering the projection error of the equation.

Even though the ROE has been surpassing the past two cyclical peaks, the level is still considerably low compared to that of the U.S. corporations, which has been at approximately 15 percent in the medium term. Furthermore, this paper has focused its analysis only on listed companies. When looking at the overall corporate sector, including small companies, the improvement in profitability is not as evident as that of the listed companies alone.

On a more fundamental level, Japan is in need of financial markets that allow smooth financing, even for companies and establishments with high credit risks, so long as they pay the appropriate cost. Based on these factors, there are still more issues to overcome before

factors, there are still more issues to overcome before Japanese companies recover from the prolonged recession in a full-fledged manner.

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¹ The ROE (return on equity) is obtained from dividing net income by shareholders' equity. It is often used as an indicator to show the rate of return and efficiency of capital.

² The paper "Recent Trends in Business Fixed Investment and the Issues Attending a Full Recovery: Restoring Companies' Capacity to Generate Capital Investment" by the Research and Statistics Department attempts a comprehensive explanation on the prolonged stagnation of business fixed investment since the 1990s (available in the *Bank of Japan Quarterly Bulletin* November 2003 issue, <http://www.boj.or.jp/en/ronbun/03/data/ron0309a.pdf>).

³ Credit ratings show the creditworthiness of individual companies in simplified signs assigned by credit rating agencies. Apart from R&I and Moody's (used in this paper), there are several credit rating agencies in Japan such as the Japan Credit Rating Agency, Ltd. (JCR), Standard and Poor's Corporation (S&P), and Fitch Ratings (Fitch).

⁴ Also includes some privately owned companies. However, electricity, gas, and railway companies, nonbanks, Japan Tobacco Inc., and Nippon Telegraph and Telephone Corporation have been excluded since their characteristics differ from those of ordinary companies.

⁵ Ideally, data on a consolidated basis should be used, but since data on this basis were available for only a short number of years, the non-consolidated basis is used here. To supplement this shortcoming, the (7) group-to-parent

shareholders' equity ratio (the ratio is assumed as "1 times" for samples with data available only on a non-consolidated basis) has been adopted. This has enabled us to incorporate cases such as even when the parent company seems to be in a healthy financial condition, the credit rating of the parent company is lowered when the nonperforming assets of its subsidiary are significant.

⁶ Strictly speaking, the ratings by Moody's are classified into "Aa3 and above"; "A1"; "A2"; "A3"; "Baa1"; "Baa2"; "Baa3"; and "Baa1 and below." For convenience in this paper, however, the grades of Moody's are expressed in the same way as those of R&I.

⁷ For instance, the debt to equity ratio can be an essential variable on deciding whether the rating is graded "BBB-" or "BB+ and below." On the other hand, there may be cases in which shareholders' equity becomes imperative when assigning high credit ratings such as "AA- and above" or "A+." The multinomial logit model used in this paper and the multinomial probit model, a similar method, are relevant when grasping these kinds of relationships.

In contrast, there is the ordered logit and ordered probit models in which weights are assumed to be unchanged despite the level of absolute credit ratings. For details on these models, see "*Junjo purobitto moderu no tesuto to shasai kakutsuke deta e no ouyou* (test on the ordered probit model and its application on data of corporate bond ratings; available in Japanese only)," by Masato Kobayashi (Institute of Monetary and Economic Studies, *Kinyu Kenkyu*, vol. 20, no.1, 2001).

⁸ Variables such as shareholders' equity, whose changes in recent years are difficult to predict, are assumed to be flat from FY2002.