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Credit spreads on corporate bonds and the macroeconomy in Japan

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Using secondary market data on corporate bonds issued in Japan between 1997 and 2005, this paper explores the determinants of the credit spread of corporate bond rates over interest swap rates. We find that the credit spreads properly reflect financial factors at the firm level, including debt-to-equity ratios, volatility, and maturity, particularly for longer-term bonds. In addition, an economy-wide factor common among bond issues unable to be captured by firm-level factors, plays an important role in determining credit spreads, and these economy-wide effects to a great extent cancel out firm-level factors for some subsample periods. We also identify possible factors responsible for the significant economy-wide effects. *J. Japanese Int. Economies* **23** (3) (2009) 309–331. Faculty of Economics, Konan University, 8-9-1, Okamoto, Higashinada, Kobe 658-8501, Japan; Faculty of Economics, Hitotsubashi University, 2-1, Naka, Kunitachi, Tokyo 186-8601, Japan.

1. Introduction

Using secondary market data on corporate bonds issued in Japan between 1997 and 2005, this paper empirically investigates the possible determinants of credit spreads on corporate bonds, including financial factors summarized at the level of individual firms as well as macroeconomic and market-wide effects.

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According to the standard frameworks for bond pricing models, including Merton (1974), credit risks mainly reflect firm-level financial factors responsible for the possibility of individual default, while interest rate risks are only determined by market-wide factors common among individual firms. Typically, these include macroeconomic conditions and monetary policies. One of the more important implications of this model is that firm-specific and macroeconomic factors responsible for the determination of credit spreads may be summarized by variables at the individual firm level. The risk-free rate is the only macroeconomic variable that appears in the standard model. Given this conventional prediction, as long as the set of firm-level explanatory variables is properly chosen to reflect both the firm-specific and macroeconomic components, the credit spreads of corporate bond rates over market interest rates can be explained mostly by firm-level financial conditions. These include debt-to-equity ratios and the volatility of corporate value, along with individual contract clauses, such as maturity and any attached options. In other words, there is little room for credit spreads to be influenced by market-wide effects (except for the risk-free rate) beyond what is captured by these firm-level financial variables and contract clauses.

We carefully and rigorously assess the empirical relevance of the above prediction by raising the following questions: namely, (i) whether credit spreads on corporate bonds reflect firm-level financial factors in a proper way; (ii) whether there are market-wide effects other than firm-level factors; and (iii) if the answer to the second question is in the affirmative, what macroeconomic conditions are responsible for market-wide factors.

Our empirical investigation is motivated mainly by the following observation concerning Japanese corporate bond markets. One of the clear and simple predictions available from standard pricing models of credit risk is the negative correlation between credit spreads and equity prices, which serves as a proxy for corporate valuation. That is, a decrease in equity prices will enhance default risk and thereby raise credit spreads on corporate bonds. Fig. 1 plots the relation between the average credit spreads on Moody's A-rated corporate bonds and the average total equity valuation of the issuing firms. As shown, there is indeed a negative correlation between credit spreads and equity valuations for both the period between 1997 and 2002, and the period between 2003 and 2005. Between 2002 and 2003, however, credit spreads declined substantially although equity valuations also fell heavily. The positive correlation in these subsample periods is uniformly observed for highly rated corporate bonds with different maturities (from less than three years to longer than 10 years). Among low-grade corporate bonds, such as Baa rated issues, a positive correlation between credit spreads and equity

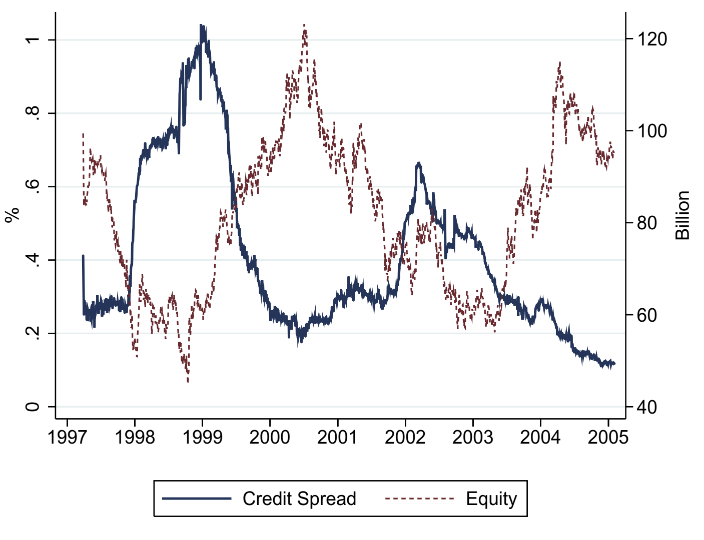

Fig. 1. Credit spreads and equity valuation: A-grade bonds. The figure plots the average credit spreads on corporate bonds rated as A by Moody's, and the average total equity valuation of corresponding issuing firms.