

The Effects of Credit Ratings on Firms' Capital Structure Decisions*

Tony T. Tang[§]

First Version: September, 2004

This Version: November, 2006

Abstract

This paper examines the impact of potential rating changes on firms' capital structure decisions through two information based models, namely the "last call" model and the mean-preserving-spread model. While the former focuses on the tradeoff between firms' cost of borrowing and the cost of delaying their financing and investment decisions, the latter studies the effect of firms' cash flow volatility. In addition, using firms' inclusion on Moody's Watchlist as a direct proxy for potential rating changes, this paper finds empirical support for the two models introduced. Controlling for firm characteristics and their default probabilities using accounting measures such as Altman's Z-Score and Olsen's O-Score, as well as market measures based on the Black-Scholes-Merton option pricing model, this paper documents the following stylized facts related to firms' credit ratings and their subsequent financing decisions. The effects of potential credit rating changes on firms' capital structure decisions are asymmetric. When faced with potential rating downgrades, firms issue more debt and have greater reliance on debt as their external finance. In contrast, when faced with potential rating upgrades, there is no significant change in their choice of external finance. Lastly, this paper finds that the effect of regular rating changes on firms' debt issuance is two times overestimated when the endogenous relation between ratings and leverage is ignored.

* I am especially grateful to the members of my dissertation committee: Douglas Diamond (Chair), Steve Kaplan, Atif Mian, and Joshua Rauh for many insightful comments and helpful discussions. I also thank Ulf Axelson, Marianne Bertrand, Per Strömberg, Franco Wong, Luigi Zingales, and seminar participants at the University of Chicago Finance Brownbag for valuable comments and suggestions. I am also grateful to Moody's Investors Service for providing me with the credit rating data.

[§] University of Chicago, Graduate School of Business, 5807 S. Woodlawn Ave., Chicago, IL 60637; email: ttang@ChicagoGSB.edu.

I. Introduction

How do firms respond to rating changes? Existing empirical studies have documented credit ratings as important third-party rating certification that facilitates firms' access to credit (Faulkender and Petersen (2005) and Sufi (2006)). However, it is not clear how credit rating changes would affect firms' capital structure decisions. While Tang (2006) provides a benchmark on the real effects of credit ratings on firms' financing decisions through a study of an exogenous rating refinement event, this paper focuses on quantifying the general effects of reoccurring rating changes on firms' capital structure decisions. In addition, it introduces two useful theoretical frameworks to study the effect of potential rating changes, and empirically examines their predictions on firms' financing decisions using their inclusion on Moody's Watchlist as a direct proxy for potential rating changes.

Studies on the effect of rating changes on firms' financing decisions have been limited largely due to their potentially endogenous relation. Firms' ratings and leverage could be jointly affected by exogenous and unobservable shocks to their investment opportunities. For example, an increase in a firm's unobservable risk could induce a rating downgrade and leverage reduction. At the same time, the rating can have a positive effect on leverage. A rating downgrade produces further leverage reduction, resulting in an endogenous relation between the two. Vice versa, a decrease in the firms' unobservable risk would lead to a significant increase in leverage. Consequently, if the effect of changes in ratings on leverage is estimated without taking into account the source of variation that produces the changes in ratings and leverage, the effect is likely to be over-estimated. Using the empirical results documented in Tang (2006) as a benchmark, this paper shows that ignoring the endogenous relation between ratings and leverage overestimates the effects of rating changes on firms' debt issuance by twice as much.

Through an examination of all the Moody's credit rating changes from 1990 to 2005, this paper finds that firms with higher credit ratings tend to issue more debt than firms with lower credit ratings. The positive relation observed between rating changes and firms' financing decisions is consistent with the notion that rating changes are proxies for change in firms' investment opportunities, as measured by the expected returns on firms' investment projects in traditional corporate finance literatures (Meyers and Majluf (1984)). However, when firms are under credit reviews for potential downgrades, they tend to issue more debt rather than less. This indicates that the expected returns, or the first-moment of the cash flow, is not the first-order

determinant in firms' financing decisions when they face potential credit rating changes. To understand the information content and the mechanism that lead to firms' debt issuance when they are under credit reviews for potential downgrades, this paper proposes two information based models, namely the "last call" model and the mean-preserving-spread model. The former focuses on the tradeoff between firms' future cost of borrowing and the cost of postponing their financing and investment decisions. When faced with potential credit rating changes, firms that want to finance their investment projects would have to pay borrow costs that are pooled across all possible firm types on the Watchlist due to adverse selection. If firms decide to delay their investments until after their credit updates, they would only have to pay borrowing costs according to their true firm types. However, they would also incur waiting costs consisting of opportunity costs and potential economic loss from limited capital market access. A low cost of waiting will induce a separating equilibrium where only over-rated firms issue early, and firms who feel under-rated would wait. A high cost of waiting on the other hand will yield a pooling equilibrium where all firms would issue early because the failure to do so could potentially force them to forgo the investments forever. Hence, this is called the "last call" model.

The second model follows the idea of mean-preserving-spread, originally introduced in Rothschild and Stiglitz (1970), and considers credit rating changes as a remapping of the underlying firm distribution (i.e. changes in the proportions of different firm types). For example, consider two firms with the same expected returns on their investment projects, but with different conditional variance of returns or the second-moment of the cash flows. More specifically, the return probability distribution function of the second firm is constructed based on that of the first by "increasing" the spread – moving mass away from the center of the distribution to its tails in a manner such that the mean remains the same. When investors cannot distinguish between these two firms, a separating equilibrium emerges – the optimal financing channels for the first firm and the second firm are equity and debt, respectively.

Using firms' inclusion on Moody's Watchlist as a direct proxy for potential rating changes, this paper finds empirical support for the two models introduced. Controlling for firm characteristics and their default probabilities using accounting measures such as Altman's Z-Score and Olsen's O-Score as well as market measures based on the Black-Scholes-Merton option pricing model, this paper finds the effects of potential credit rating changes on firms' capital structure decisions are asymmetric. When faced with potential rating downgrades, firms

issue more debt and have greater reliance on debt as their external finance. In contrast, when faced with potential rating upgrades, there is no significant change in their choice of external finance.

This paper makes several contributions to existing capital structure literature, as well as to credit rating literature. Adding to an extensive list of capital structure literature (Jensen and Meckling (1976), Miller (1977), Myers and Majluf (1984), Titman and Wessels (1988), Fama and French (2002), Baker and Wurgler (2002), Welch (2004), Leary and Roberts (2005)), this paper studies the role of credit ratings in determining firms' capital structure. In related works, while Faulkender and Peterson (2003) and Sufi (2006) examine how capital structure differs between firms with rated debt and those without it, this study offers a closer look at the capital structure decisions of firms with different credit ratings. This paper is also closely related to Tang (2006), which studies the effect of one-time exogenous change in firms' ratings on their real outcomes using Moody's 1982 rating refinement. Complementary to Tang (2006), this paper examines the effect of reoccurring endogenous rating changes on firms' financing decisions. Lastly, this paper adds to a small body of literature on firms' leverage decisions in anticipation of potential rating changes (Kisgen (2003)). Using firms' inclusion onto Moody's Watchlist as a direct proxy of potential credit rating change, this paper observes empirical results that are consistent with two simple information asymmetry based models but are the opposite of those shown in Kisgen (2006).

The rest of this paper is organized as follows. Section II provides a brief overview of credit ratings and the Watchlist. Section III introduces the mean-preserving-spread model and the "last call" model to analyze the effects of potential credit rating changes on firms' choice of external finance. Section IV describes the data, followed by empirical analyses in Section V. Section VI concludes the paper.