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Article

Debt refinancing and credit risk

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ABSTRACT

Many firms choose to refinance their debt. We investigate the long run effects of this extended practice on credit ratings and credit spreads. We find that debt refinancing generates systematic rating downgrades unless a minimum firm value growth is observed. Deviations from this growth path imply asymmetric results. A lower firm value growth generates downgrades and a higher firm value growth generates upgrades, as expected. However, downgrades tend to be higher in absolute terms. We also find that the inverse relation between credit spreads and risk free rate that structural models usually predict still holds in this setting, but only in the short run. This negative relation will turn to be null in the medium run and positive in the long run.

1. Introduction

Many different reasons may be behind the decision of a particular firm to issue new debt: financing a new investment project, getting funds to operate in a period of low earnings, or simply refinancing existing debt. The purpose of the issue is not irrelevant. An example is provided by Gande et al. (1997), who examine differences in debt securities underwritten by Section 20 subsidiaries of bank holding companies relative to those underwritten by investment houses. Among other results, they find that when debt is used to refinance existing debt, the credit spread is on average 14 basis points above the one that results considering "other purposes". Intuitively, if the purpose of the issue is to finance a new investment project that will increase the expected earnings of the firm, and its market value, then the risk premium should be lower than in the case in which debt proceeds are used to refinance existing debt, because in this situation no added value is created.[1] Refinancing current debt, however, seems to be one of the most important – if not the first – reason to issue new debt. The mentioned article for instance considers a sample in which 43.5% of the issues had the purpose to refinance existing debt. More evidence in this line is given by Hansen and Crutchley (1990), who investigate the relationship between corporate earnings and sales of common stocks, convertible bonds, and straight bonds. In this case, 64% of straight bond issues were used at least partially to refinance existing debt. This ratio grows up to 72% when they consider convertible debt.

In spite of the fact that debt refinancing appears as an extending practice, we know little about how this can potentially affect the credit standing of a firm in the long run. The present article represents a first attempt in this direction. We introduce the concept of refinancing contract, modeling dividend rates, maturities, and nominal debt payments, as part of this contract. We then describe the credit spreads faced by the firm to refinance as a function of the firm characteristics and the specific contract selected, and analyze how the fact that firms choose to refinance their debt can potentially affect the credit rating and the credit spreads of those firms in the long run.

The main conclusions of the paper are the following. First, debt refinancing generates systematic credit rating downgrades unless a minimum firm value growth is observed. Deviations from such a firm value growth path imply asymmetric results. While a lower firm value growth results in systematic downgrades and a higher firm value growth in systematic upgrades, as expected, the same deviation will have a higher effect in absolute terms when it is negative than when it is positive. Said in other words, we should expect rating migrations to exhibit a certain degree of inertia among those

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[1] The theoretical argument given by Gande et al. (1997) to justify different credit spreads depending on the purpose of the issue is nevertheless not the same we provide here. They argue that when a firm has a bank loan, and wants to refinance it with public debt, potential buyers may expect that the firm has been induced by the bank to take this decision because the loan is at risk. However, significant differences are found even when new issues are classified as "investment grade". This indicates that debt refinancing is not a practice that firms use only in case of, or to avoid, credit distress.

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companies that choose to refinance their debt, and this inertia should be stronger in the case of downgrades than in the case of upgrades. Evidence in this regard has been actually provided by Altman and Kao (1992). Specifically, they find positive autocorrelation in S&P downgrades and upgrades for high-yield bonds, being this autocorrelation stronger in the case of downgrades.

The second main conclusion of the paper is that the traditional prediction of an inverse relation between credit spreads and risk free rate (Merton, 1974; Leland, 1994; Longstaff and Schwartz, 1995) holds just in the short run. Debt refinancing makes such relation to turn null in the medium run and positive in the long run. Evidence of this dynamic relation is in fact provided by Longstaff and Schwartz (1995) (negative effect in the short run) and Guha et al. (2001) (positive effect in the long run). Overall, we conclude that the common practice of debt refinancing and results provided in this paper allow explaining, in a unified framework, the empirical evidence on the dynamic relation between risk free rate and credit spreads.

The rest of the article is organized as follows: Section 2 introduces the concept of refinancing contract, and describes when, and how, a contract of this type with an arbitrary number of future payment dates n, can be designed. Section 3 analyzes the effects of debt refinancing under the specific cases of $n=1$ and $n=2$.[2] Finally Section 4 summarizes the main findings of the paper.

2. The general case

The following assumption summarizes our theoretical framework.

Assumption A.

A1: There are no taxes, problems concerning indivisibility, bankruptcy costs, transactions costs, or agency costs.
A2: Trading takes place continuously.
A3: There exists a risk free asset with constant interest rate r, that applies for borrowing and lending, and for any maturity.
A4: Every individual acts as if she can buy or sell as much of any security as she wishes without affecting the market price.
A5: Individuals may take short positions in any security, including the risk free asset, and receive the proceeds of the sale. Restitution is required for payouts made to securities held short.
A6: Modigliani–Miller Theorem obtains, that is, the firm value is independent of its capital structure.
A7: The firm value, V, follows the diffusion process given by

$$dV = (\mu - \delta)V\,dt + \sigma V\,dz, \tag{1}$$

where μ is the expected rate of return on V, δ is the constant rate of firm value which is paid to equity holders as dividends, σ is the volatility of the rate of return which will be assumed to be constant, and z is a standard Brownian motion.

No assumption is made at this moment about the profile of nominal payments that constitute the corporate debt. We simply assume that a debt contract was signed at some period prior to current period t. Under this contract, at least a certain debt payment has to be satisfied at some future period $\tau > t$. This, and any posterior debt payment, is to be financed by issuing additional equity. Under these conditions the equity and debt values will be a function of the firm value and time. Denote then the equity value as $S(V,t)$, and the debt value as $F(V,t)$. We start by defining the general form of any refinancing contract.

[2] This last case can be seen as a simplification to short and long term debt.

Definition. A refinancing contract between the firm and the debt holders at τ, is a vector $\Theta \equiv (\delta, \Psi, \Upsilon) \in \Re \times \Re^n \times \Re^n$, with $n < \infty$, by which:

(a) The firm, which is assumed to maximize equity holders' wealth, promises (under limited liability) the payment of Ψ at Υ, that is, the payment of ψ_i at τ_i, where $\psi_i \in \Psi$, $\tau_i \in \Upsilon$, $i = 1, \ldots, n$, and $\tau_1 > \tau$.
(b) The firm also restricts itself to apply a dividend rate equal to δ, and loses the right to issue new debt. These restrictions apply until Θ has been canceled, either by satisfying nominal payments regularly (issuing new equity), or by means of a posterior debt refinancing contract.
(c) The debt holders renounce to $F(V,\tau)$.

We say that Θ is feasible, if and only if the firm and the debt holders are willing to sign Θ. The set of feasible Θ is denoted by Θ^F.

A refinancing contract (RC) is therefore similar to a standard debt contract. The main difference is that debt holders do not provide cash to the firm at issuance, but the renounce to the payment of current debt (covenant c). In addition, we include an agreement on dividends (covenant b). This agreement prevents equity holders from extracting a higher share of the firm value (with the implied reduction for debt holders), by increasing the dividend rate after signing the contract.

The following lemma establishes a necessary condition for a feasible set of refinancing contracts to exist.

Lemma. *Let $S(V,\Theta,\tau)$ and $F(V,\Theta,\tau)$ denote the equity and debt value at τ when the value of the firm is V, the debt profile consists on the payment of Ψ at Υ, and the dividend rate is δ. Then, $\Theta \in \Theta^F$ if and only if $S(V,\Theta,\tau) = S(V,\tau)$, implying $S(V,\tau) > 0$ as a necessary condition for a feasible Θ to exist.*

Proof. See Appendix A.

Although a formal statement of the proof is in the appendix, the intuition is straightforward. Modigliani and Miller's Theorem implies that no value is created or destroyed in the firm by refinancing its debt. As a consequence, equity holders can neither gain, nor lose due to refinancing. If they are worst off with the contract they will simply refuse it, but if they are better of this means that debt holders are worst off, and in this case they will be those who refuse the contract. This allows us to identify the set of feasible refinancing contracts with the set of contracts that leave equity holders with the same value. On the other hand, limited liability makes the equity value to be strictly positive if no current debt payment has to be satisfied, which is the case after signing the contract. This makes $S(V,\tau) > 0$ finally to be a necessary condition for a feasible contract to exist. One implication is that equity and debt can still be valued assuming that debt will be paid by issuing additional equity. The reason is that the possibility of refinancing will not alter their welfare with respect to this situation in any sense. We set up this argument as follows:

Remark. Refinancing does not alter neither equity holders, nor debt holders' wealth. This implies that $S(V,\Theta,\tau)$ and $F(V,\Theta,\tau)$ can be valued assuming that debt payments are to be financed by issuing new equity, even if this never happens, that is, even if the firm always chooses to refinance its debt.

Searching for a feasible contract implies at this point searching for $2n+1$ elements. The following restriction on the relation between debt payments, and on the time spread between these payments, will allow us to reduce the dimension of the problem to 3.

Restriction. Let $\Psi = \psi_1 \Phi$, where Φ is the n-dimensional vector which first element ϕ_1 equals 1, and the remaining are some