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Contingent capital, capital structure and investment

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ABSTRACT

We examine the interaction between investment and financing policies in a dynamic model for a firm with existing assets-in-place and a growth option, of which investment cost is financed with equity and contingent convertible bonds (CoCos). We attempt to clarify how CoCos impact on investment timing, capital structure and inefficiencies arising from debt overhang and asset substitution. We show that there is a conversion ratio (the fraction of equity allocated to CoCo holders upon conversion) to eliminate the inefficiencies. Our conclusions predict that debt leverage decreases with investment option payoff factor and the average appreciation rate of the cash flow. In contrast to traditional corporate finance theory saying that a firm's value decreases globally with business risk, our model indicates that it might first decrease and then increase with asset volatility.

1. Introduction

In the global financial crisis of 2007/2009, many financial institutions have experienced serious financial distress, under which some financial companies cannot raise new funds from the market and had to rely on governments to provide capital, i.e. government bailouts. But emergency-type government bailouts can be controversial since its essence is to give the taxpayers' money to the troubled financial institutions, which inevitably leads to a serious moral hazard problem. In order to enhance the stability and bail-in ability of financial institutions, a proposal that has recently drawn

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much attention of researchers and regulators is to encourage banks to contain contingent convertible bond (CoCo, henceforth) in capital structure. Since CoCo was first issued by Lloyds Banking Group in November 2009, it has been widely welcomed by banks of many countries in the world, such as Rabobank, Credit Suisse and Barclays. Although this is a relatively small market segment, it has been growing sharply in recent years. Avdjiev, Bolton, Jiang, Kartasheva, and Bogdanova (2015) report that banks around the world have issued a total amount of 208 billion dollars of CoCos through 188 different issues between January of 2009 and September 2014. In China, for the first time in July 2013, Tianjin Binhai rural commercial bank issued RMB 1.5 bn yuan of the write-down contingent capital, which is a special kind of CoCos. According to some statistics, the banks in China have duly stepped up issuance: from nothing in 2012 to RMB 358.35 bn yuan of CoCos by December 2014.

CoCo is a hybrid bond that can automatically converts into equity or writes down as soon as the issuer's financial health deteriorates to a pre-specified threshold. This new feature of CoCo poses some interesting issues. For example, CoCo may affect the capital structure of the issuing company and induce several issues related to shareholders' value enhancement, regulatory supervision, financial stability, investment decisions and risk taking incentive as documented in Jensen and Meckling (1976) and Leland (1998). These issues have been analyzed by Barucci and Del Viva (2013), Koziol and Lawrenz (2012) and Hilscher and Raviv (2014) among others.

However, to the best of our knowledge, except for Tan and Yang (2015), there are no papers in the literature examining how CoCo impacts on expansion investment and financing policies in a dynamic model. This is the issue that we address in this paper.

We assume in our model that a firm has already existing assets which have been financed by equity and straight debt. Additionally, the firm has a growth option to expand existing assets and upon exercise, the earnings before interest and tax (EBIT) increase by a constant factor. The investment cost is raised by issuing equity and CoCo bonds instead of straight bonds (CoCo-equity financing, henceforth). Thus, after the investment the firm's capital structure consists of three claims: Equity, straight bonds and CoCo bonds. We restrict our attention to the use of CoCo bonds for financing the investment cost.

Why finance the growth option by issuing CoCo bonds? First, CoCo bond financing will lessen investment distortion to expand the existing assets-in-place. Myers (1977) argues that shareholders underinvest in growth option under pure-equity financing since shareholders bear entire costs to exercise growth option but share investment benefits with the existing debtholders. On the other hand, Hackbarth and Mauer (2012) state that shareholders overinvest if investment cost is financed by issuing equity and straight bond (SB, henceforth). The economic intuition behind this is that shareholders harvest full benefits from premature investment but share investment costs with additional debtholders and leave more bankruptcy loss to initial debtholders since a larger default risk is undertaken by initial debtholders. Unlike these two financing choices, due to the fact that CoCos are hybrid bonds and they can automatically convert into equity from debt when the issuer's financial health deteriorates to a certain level, the investment threshold under the CoCo-equity financing will be less than that under the pure-equity financing but larger than that under the SB-equity financing and therefore, the CoCo-equity financing can not only mitigate the underinvestment problem considered by Myers (1977) but also alleviate the overinvestment one by Hackbarth and Mauer (2012).

Second, as argued by Flannery (2005) and shown in our paper, the CoCo bond financing may reduce information asymmetry and mitigate the well-known lemons problem since it can decrease failure probabilities and lessen the inefficiencies arising from the risk-taking incentives and debt overhang. A large equity issuance involves a well-known lemons problem in which firms issue equity when insiders believe the shares are overvalued in the market, see e.g. Myers and Majluf (1984). The issuing of CoCo bonds may permit managers to finance growth with equity without controlling when that equity is issued. Therefore, as suggested by Hillion and Vermaelen (2004), issuing equity through CoCo bonds may improve its issuing price.

Third, the tradeoff theory of capital structure assumes that a firm balances the tax and agency benefits of debt against the costs of potential investment distortions and financial insolvency. The CoCo financing will increase the firm value since it not only has the tax advantages of bonds, but also