Do Call Provisions Reduce Agency Costs of Debt Irrespective of Maturity and Seniority?

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ABSTRACT
The agency cost of debt results from conflicting interests between debtholders and stockholders. Since Jensen and Meckling (1976) first introduced the concept of the agency cost of debt, much research has focused on reducing this cost. This study is based on the idea that the agency cost of debt is reflected in bond ratings. We test empirically whether inclusion of call features is related to the maturity and seniority of debt issues. We find that the seniority is related to call features such that junior bonds are more likely to be callable as predicted by theories. However, maturity is not found to be related to the inclusion of call features in debt contract. We further examine whether call features reduce agency costs of debt, and whether this reduction depends upon the maturity and seniority of debt. We found that inclusion of call features reduce the agency costs of debt irrespective of maturity and seniority of debt issues.

INTRODUCTION

The agency problem that exists between stockholders and bondholders of a corporation arises from the conflict of interests between the two major stakeholders of the firm. A reduction in firm value due to this conflict is an agency cost of debt. Galai and Masulis (1976) analyze the agency costs of debt from the perspective that the common stock of a levered firm is equivalent to a European call option with exercise price that is equal to the total amount of debt. Stockholders, as call option holders, gain as the risk of firm assets rises as they pursue high-risk projects. Generally, high risk projects tend to have high return (i.e. higher profitability). To the extent that stockholders have limited liability, they would have an incentive to pursue such high-risk and profitable projects. Rarely are there exceptionally good projects that have high profitability and yet low risk. Despite their desirable nature, these projects might be rejected by the firm's shareholders whenever most of benefits from those projects fall on bondholders who invested in the projects. Bodie and Taggart (1978) and Thatcher (1985) show how call provisions in the bond indenture can reduce agency costs of debt. By exercising the right to call the bonds early, shareholders can limit the gain to bondholders from these projects to the call premium. Thus, call features effectively allow shareholders to net a larger portion of the gain from accepting the projects with high profitability and yet low risk. Stockholders refrain from pursuing high risk and unprofitable projects lest the value of call features would drop as firm value declines due to high risk of the project. Obviously, call features in the debt contract serve as deterrent to stockholders'

risk incentive-related agency costs of debt. These high-risk and unprofitable projects would result in decline in firm value, and as a result, the value of call feature falls as well. Being concerned about this decline in the value of call feature, stockholders will refrain from undertaking those undesirable projects imprudently mainly driven by the wealth transfer incentive. In a nutshell, call provisions in bond indenture contribute to increasing firm value by reducing agency costs of debt. Thus, call provisions tend to be included in a debt contract for long term and junior bonds which are more susceptible to the wealth transfer agency costs of debt.

As postulated by Taggart and Bodie (1978) and Barnea, Hauge, and Senbet (1980), risk incentive agency costs can be reduced by issuing callable bonds because the call option value (i.e., stockholders' wealth) declines as management shifts to riskier projects that reduce firm value. These theories, however, are not supported by empirical results from Crabbe and Helwege (1994), who conclude that call features do not reduce the agency costs of debt.

In this paper, we test how call features are related to maturity and seniority of bonds. Then, we examine whether call provisions reduce agency costs of debt regardless of time priority and seniority.

LITERATURE REVIEW

Taggart and Bodie (1978), Barnea et al. (1980) and Thatcher (1985) examine how a call feature can reduce the agency costs of debt. When bondholders appear to reap most of profit from the low risk, albeit profitable, projects, stockholders would not be interested in investing in these types of projects, resulting in underinvestment. This particular agency cost can be reduced by callable bonds. By including early call provisions on the bonds, stockholders capture a larger portion of the gain from undertaking low-risk but profitable projects by limiting the bondholders' gain to just the call premium. Stockholders' incentive to increase their wealth at the expense of bondholders by investing in high risk, albeit unprofitable, projects can also be lessened by call features because the value of the stockholders' call option declines with a fall in firm value due to the high-risk albeit unprofitable projects.

An empirical paper by Crabbe and Helwege (1994) fails to support reduction in the agency cost of debt due to a call feature. First, they note that agency theories such as asymmetric information, asset substitution, and the underinvestment problem are difficult to distinguish empirically; then, they test the theories for agency cost reduction from the issuance of callable bonds. Overall, they find little support for any of the theories suggesting that call features can mitigate the agency problem.

Banko and Zhou (2010) find that firms with both information asymmetry and underinvestment problems often issue callable bonds. However, risk-shifting is not a major determinate in the use of callable bonds. Chen, et al. (2010) find that the use of callable bonds reduces the risk-shifting problem.

Secured debt has an inherent contractual protection for creditors in that assets are pledged as collateral until the debt is fully redeemed. Stultz and Johnson (1985) demonstrate how secured debt moderates the contracting cost associated with mitigating the underinvestment agency problem. Secured debt holders' first claim to the profits of low-risk albeit profitable projects limit the gains realized by the outstanding unsecured debt holders. Stockholders end up with a wealth gain due to an increase in firm value resulting from a higher market price for the new secured debt. Shareholders' manipulation of debt structure induces another form of conflict of interest between secured bondholders and unsecured bondholders. By having them pit against each other, shareholders gain as firm value increases due to adding senior debt to the existing debt structure.

Smith and Warner (1979), argue that secured debt precludes asset substitution of risky assets for existing assets, thus decreasing the administrative and enforcement costs of debt contracts. Myers and Majluf (1984) argue that investor uncertainty about firm assets in place can be reduced by the use of secured debt. Therefore, agency costs of debt can be reduced because the tangible assets pledged for secured debt provide collateral. A financial lease contract is essentially secured debt in that the lender (i.e., lessor) has legal claim to the leased assets at the time of the contract. Thus, a financial lease can be used like a secured debt to reduce agency costs of debt as it precludes asset substitution and reduces asset uncertainty.

Bhojraj and Sengupta (2003) show that corporate governance mechanisms are linked to higher bond ratings and lower bond yields. Using probit regression, they find that governance mechanisms can reduce default risk by mitigating agency costs and monitoring managerial performance and by reducing information asymmetry between the firm and the lenders.

OBJECTIVE OF STUDY

In this paper, we test empirically how call features are to be determined by time priority and seniority as postulated by those theories. Then, we examine whether call provisions reduce agency costs of debt irrespective of time priority and seniority by comparing agency costs of debt between two groups: long term/junior debt issues (high group) vs. short term/senior debt issues (low group).

DATA AND VARIABLES

All data were compiled directly from the Securities and Exchange Commissions' EDGAR database which lists the prospectuses for all recent and past bond issues. Bond indentures of the 681 sample bond issues, registered with the SEC in 2006 and 2007 by the Dow Jones thirty blue chip industrial firms, were examined for seniority and call features. The sample has 423 callable bonds and 257 non-callable bonds. Other bond features such as maturity, seniority and change in bond rating were collected as well. Maturity should be a key determinant of including call features in the debt contract. The model of Barnea et al. (1980) suggests that long-term securities provide less discipline on borrowing firms. Hence, long-term bonds should carry higher agency costs. It is predicted, therefore, that the probability of including call provisions increases as the maturity of bonds increases. The maturity of sample bonds ranges between 3 years and 50 years with the average maturity of the sampled bonds is 17.03 years. However, both median and mode are 10 years respectively, thus we used 10 year maturity as a line of demarcation between short-term and long-term. Also, the sample consists of 172 senior bonds and 509 junior bonds. Sample bonds experienced downgrading from initial ratings to lower ratings on average at the end of September 2009 when we collected data. Using the conversion scale described below, average change in bond rating of sample bonds is -0.423 which is equivalent to downgrading by slightly less than half of a notch.

The call feature is quantified by using an indicator variable: 1 for callable bonds and 0 for non-callable bonds. Bond ratings are proxies for agency costs that are highly correlated with default risk (Crabbe and Helwege, 1994). Our basic conjecture is that bond ratings are inversely related to the agency costs of debt, which, in turn, are directly related to the probability of including call features in bond indenture. All of the sample bonds were investment-grade at the time of issue. For bond ratings, the following conversion scale is used to assign a numerical value to each rating: AAA+ = 12, AAA = 11, AAA− = 10, AA+ = 9, AA = 8, AA− = 7, A+ = 6, A = 5, A− = 4, BBB+ = 3, BBB = 2, BBB− = 1.

Table 1: Descriptive Statistics of Variables for Sample Bonds

Statistic	*Change in Bond Rating*	*Maturity*	*Seniority*	*Interaction*	*Call Features*
Mean	-0.423	17.034	0.253	3.545	0.622
Median	0	10	0	0	1
Mode	0	10	0	0	1
# of Bonds	681	681	681	681	680

EFFECT OF MATURITY AND SENIORITY ON INCLUDING CALL FEATURES

Inclusion of call provisions in debt contract is rationalized (Tirole, 2006) by its effect of reducing agency costs of debt (Jensen and Meckling, 1976; Smith and Warner, 1979). In our empirical model, we test how significantly the dependent variable, i.e., call features, are related to two independent variables (maturity and seniority) and the third variable for the possible interaction of the two. The dependent variable has two dichotomous outcomes: 1 for callable bonds and 0 for non-callable bonds. This binary dependent variable is regressed on the above three independent variables to estimate the probability of call features being included in debt contract. The linear regression model is:

$$Y_i = \alpha + \beta_1 \cdot X_{1i} + \beta_2 \cdot X_{2i} + \beta_3 \cdot X_{3i} + \varepsilon_{i,}$$

where Y_i = 1 or 0 for call provisions, X_{1i} = maturity, X_{2i} = seniority, X_{3i} = interaction of the two. The linear regression results reveal the agency costs of debt (proxied by changes in bond rating) are related to each explanatory variable. The ordinary least squares model's regression results are shown in Table 2.

As shown in Table 2, the dependent variable (the probability of call provisions in place) is positively related to maturity. This positive relationship, however, is statistically insignificant at 5% to support the postulated relationship that the longer maturity bonds are more likely to have call features in debt contract due to higher agency costs of debt.

The negative relationship between seniority and call provisions is statistically significant at a 5% alpha (with p-value 0.035) in support of the postulated relationship by theories that senior bonds are less likely to be callable due to lower agency costs of debt. That is, junior bonds with higher agency costs of debt are likely to be issued with call provisions.

The effect of the interaction variable is insignificant with p-value of 0.35. This implies that there is no interaction between maturity and seniority in determination of call features in debt contract. The empirical regression model is robust with an F-statistic of 11.00 that is highly significant with a p-value close to zero.

EFFECT OF MATURITY, SENIORITY AND CALL FEATURES ON THE REDUCTION OF AGENCY COSTS OF DEBT

In this section of the paper, we examine how the reduction of agency cost of debt is related to maturity, seniority and call provisions. The linear regression model is:

$$Y_i = \alpha + \beta_1 \cdot X_{1i} + \beta_2 \cdot X_{2i} + \beta_3 \cdot X_{3i} + \beta_4 \cdot X_{4i} + \varepsilon_{i,}$$

where Y_i = change in bond rating (as an inverse proxy variable for the reduction of agency costs of debt), and X_{1i} = maturity, X_{2i} = seniority, X_{3i} = interaction of the two, and lastly binary

variable X_{4i} is call features. The dependent variable, change in bond rating, is an inverse proxy variable for the reduction of agency costs of debt. That is, if the change in bond rating is positive, the bond has been upgraded, and this upgrade is due to reduced agency costs of debt. If the change is negative, it is associated with increased agency costs of debt. The results of the ordinary least squares fit to the data are shown in Table 3.

Table 2: Regression of Call Features on Independent Variables

Summary Output

Regression Statistics	
Multiple R	0.216
R Square	0.047
Adjusted R Square	0.042
Standard Error	0.475
Observations	681

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	7.454	2.485	11.009	0
Residual	677	152.8014764	0.225704		
Total	680	160.2555066			

	Coeff.	*Standard Error*	*t Stat*	*P-value*
Intercept	0.6043168	0.041	14.772	0
Maturity	0.00235	0.002	1.21	0.227
Seniority	-0.166194	0.079	-2.101	0.036
Interaction	0.00420371	0.005	0.932	0.352

The independent variables, maturity and seniority, are positively related to the dependent variable (reduction of agency costs of debt). The positive coefficient of maturity and seniority is consistent with postulation of theories that bonds of longer maturity and senior standing have larger reduction of agency costs debt as reflected on bond rating upgrade. However, the positive coefficient of seniority is not consistent with the prediction of theories that junior bonds have larger reduction of agency costs. These mixed results are statistically insignificant.

The last independent variable, call features, appears to be positively related to change in bond rating, and its coefficient is statistically significant with p-value zero. This result is in strong support of the theories that call features reduces agency costs of debt. The empirical regression model is robust with F-statistic of 8.765 that is statistically significant with p-value zero.

In summary, the regression analysis shows that the relationship between maturity and agency costs of debt is statistically insignificant and yet consistent with theory. However, the relationship between seniority and reduction of agency costs of debt is neither statistically significant nor consistent with the prediction of theories. Call provisions appear to be the only independent variable that contributes to the reduction of agency costs of debt with a statistically

significant coefficient. This finding of positive effect of call provisions on the reduction of agency costs of debt leads us to further testing of differential effect between two groups: short term, senior bonds and long term, junior bonds. As shown in Table 4, the t-test shows a statistically insignificant difference in bond rating downgrades (i.e., increases in debt agency costs) between two groups of bonds.

Table 3: Regression of Change in Bond Rating on Maturity, Seniority and Call Features

Summary Output

Regression Statistics	
Multiple R	0.222
R Square	0.049
Adjusted R Square	0.044
Standard Error	1.766
Observations	681

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	109.373	27.343	8.765	0
Residual	676	2108.83	3.12		
Total	680	2218.203			

	Coeff.	*Standard Error*	*t Stat*	*P-value*
Intercept	-0.953	0.175	-5.452	0
Maturity	0	0.007	0.014	0.989
Seniority	0.212	0.295	0.717	0.473
Interaction	0	0.017	0.018	0.985
Call Features	0.764	0.143	5.345	0

Table 4: t-test for Difference in Bond Downgrades Between Two Groups of Bonds: Short Term/Senior Bonds vs. Long Term Junior Bonds

	ST/Senior	*LT/Junior*
Mean	-0.22609	-0.52439
Variance	3.123875	4.152464
Observations	115	246
Hypothesized Mean Difference	0	
df	254	
t Stat	1.421394	
P(T<=t) one-tail	0.078214	

DIFFERENTIAL EFFECT OF MATURITY AND CALL FEATURES ON AGENCY COSTS OF DEBT: SHORT TERM/ SENIOR BONDS VS. LONG TERM/ JUNIOR BONDS

In order to examine whether call provisions reduce agency costs of debt any differently between two groups, we now contrast two subsamples of 115 short term/senior bonds and 246 long term/ junior bonds. Theories predict that call provisions tend to be included in the issues of long term/junior bonds rather than short term/senior bonds because the former have higher agency costs of debt to be reduced by call provisions than the latter. The linear regression model is:

$$Y_i = \alpha + \beta_1 \cdot X_{1i} + \beta_2 \cdot X_{2i} + \varepsilon_{i,}$$

where Y_i = change in bond rating (as an inverse proxy variable for the reduction of agency costs of debt), and X_{1i} = maturity, X_{2i} is call features. The ordinary least squares model's regression results are shown in Table 5 for the group of short term/senior bonds and Table 6 for the other group of long term/junior bonds, respectively.

For both groups of bonds, effect of maturity on the reduction of agency costs of debt is statistically insignificant. However, call features appear to have a statistically significant and positive relationship with reduction of debt agency costs in strong support of theories with p-values of zeros for both groups. This result should be interpreted that call features appear to reduce agency costs of debt irrespective of maturity and seniority of bonds.

The empirical regression model for both groups is robust with F-statistics of 7.74 and 5.60 for short term/senior bonds group and long term/.junior bonds group, respectively, and both statistics are significant with p-values zero.

Table 5: Regression of Change in Bond Rating on Maturity and Seniority (Short Term/Senior Bonds Group)

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.348
R Square	0.121
Adjusted R Square	0.106
Standard Error	1.671
Observations	115

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	43.243	21.621	7.74	0
Residual	112	312.879	2.794		
Total	114	356.122			

	Coeff.	*Standard Error*	*t Stat*	*P-value*
Intercept	-1.824	0.681	-2.68	0.008
Maturity	0.049	0.074	0.666	0.507
Call Feature	1.465	0.396	3.702	0

Table 6: Regression of Change in Bond Rating on Maturity and Seniority (Long Term/Junior Bonds Group)

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.21
R Square	0.0441
Adjusted R Square	0.036
Standard Error	2.001
Observations	246

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	44.836	22.418	5.602	0.004
Residual	243	972.518	4.002		
Total	245	1017.354			

	Coeff.	*Standard Error*	*t Stat*	*P-value*
Intercept	-0.808	0.538	-1.501	0.135
Maturity	-0.006	0.018	-0.33	0.742
Call Feature	0.849	0.256	3.322	0.001

CONCLUSION

Incorporation of call features in debt contract is rational choice of bondholders to protect their wealth from risk incentive-related agency costs of debt. In this paper, we revisit an age old query of whether agency costs of debt can be reduced by adding call features to debt issues with more pronounced reduction for debt issues with long term in maturity and junior standing in priority structure.

Seniority is found to have an effect on the determination of call features in debt issues. The results of our empirical testing is consistent with the prediction of theories that junior bonds are more likely to have call features due to their higher agency costs of debt. Effect of maturity on the determination of call features is statistically insignificant and yet consistent with the prediction of theories that long term bonds due to their higher agency costs of debt are more likely to have call features in debt issues than short term debt.

Change in bond rating (used as an inverse proxy for the change in agency cost of debt) is found to be positively related to call features for all bonds irrespective of their maturity and seniority. This result is in strong support of the prediction of theories that call features mitigate risk incentive agency problems and reduce agency costs of debt. This positive effect of call features on reducing agency costs of debt appears to permeate in debt issues irrespective of maturity and seniority.

REFERENCES

Banko, J. & Zhou, L. (2010). Callable Bonds Revisited. *Financial Management*, 39, 613-641.

Barnea, A., Haugen, R.A., and L.W. Senbet (1980). "A Rationale for Debt Maturity Structure and Call Provisions in the Agency Theoretic Framework." *Journal of Finance,* 35, 1223-1234.

Bhojraj, S., and P. Sengupta (2003). "Effect of Corporate Governance on Bond Ratings and Yields: The Role of Institutional Investors and Outside Directors." *Journal of Business*, 76, 455-476.

Chen, Z., Mao, C., &Wang, Y. (2010). Why Firms Issue Callable Bonds: Hedging Investment Uncertainty. *Journal of Corporate Finance*, 16, 588-607.

Crabbe, L., and J. Helwege (1994). "Alternative Tests of Agency Theories of Callable Bonds." *Financial Management,* 23, 3-20.

Jensen, M.C., and W.H. Meckling (1976). "Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure." *Journal of Financial Economics,* 3, 305-360.

Myers, S., and N. Majluf (1985). "Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have." *Journal of Financial Economics,* 13, 187-221.

Smith, C., and L. Wakeman (1985). "Determinants of Corporate Leasing Policy." *Journal of Finance*, 40, 895-908.

Smith, C., and J. Warner (1979). "On Financial Contracting: An Analysis of Bond Covenants." *Journal of Financial Economics,* 7, 117-161.

Stultz, R., and H. Johnson (1985). "An Analysis of Secured Debt." *Journal of Financial Economics,* 14, 501-521.

Taggart, R., and Z. Bodie (1978). "Future Investment Opportunities and the Value of the Call Provision on a Bond." *Journal of Finance,* 33*,* 1187-1200.

Thatcher, J.S. (1985). "The Choice of Call Provision Terms: Evidence of the Existence of Agency Costs of Debt." *Journal of Finance,* 40, 549-561.

Tirole, J. (2006). *The Theory of Corporate Finance*. Princeton, NJ: Princeton University Press.