Managerial equity incentives and anti-dilutive convertible debt decisions

Henri Akono
Maine Business School, The University of Maine, Orono, Maine, USA

Received 26 December 2016
Revised 30 June 2017
9 October 2017
Accepted 12 December 2017

Abstract

Purpose – This paper aims to examine whether high equity incentives motivate executives to avoid issuing convertible debt and/or to design convertible debt issues as anti-dilutive to earnings-per-share (EPS).

Design/methodology/approach – Tests are conducted using the Heckman two-step probit model to control for potential self-selection bias between firms that issue straight debt and those that issue convertible debt. Further, analyses are conducted separately and jointly for the Chief Executive Officer (CEO) and the Chief Financial Officer (CFO) to assess the differential impact of CEOs' and CFOs' equity incentives on convertible debt issuance and design decisions.

Findings – Firms are more likely to design convertible debt issues as anti-dilutive to EPS when CFOs have high levels of equity incentives, but only when the firm stock price is sensitive to diluted EPS. High CEOs' equity incentives have limited impact of convertible debt issuance and design decisions.

Research limitations/implications – The main limitation of this study is the generalizability of the findings and implications of this study due to the smaller sample size of convertible debt issues.

Originality/value – Prior research has shown that bonus incentives influence CEOs with disincentive for EPS dilution and motivate them to make anti-dilutive financing decisions. Further, there is evidence that high equity incentives motivate CEOs to manage earnings to boost short-term prices. This study extends prior literature by showing that high equity incentives provide executives with disincentive for EPS dilution and motivate CFOs to design convertible debt issues as anti-dilutive to EPS possibly to avoid reduced stock prices. Further, this study shows that CFOs have greater influence over convertible debt design choices than CEOs do.

Keywords Chief executive officer, Chief financial officer, Convertible debt, EPS dilution, Managerial equity incentives

Paper type Research paper

1. Introduction

Convertible debt has been of interest to accounting and finance researchers in part because of its potential to reduce risk-shifting problems (Dorion *et al.*, 2014). In particular, agency cost of debt models (Green, 1984) predict that firms with greater propensity for risk-shifting problems will use more convertible debt and/or will design convertible debt issues as more dilutive to earnings-per-share (EPS).

This paper is derived from my doctoral dissertation at the University of Texas San Antonio. I want to extend my warmest thanks to my committee, Dr Emeka Nwaeze (Chair), Dr Sharad Asthana, Dr Jeff Boone, Dr Jennifer Yin, and Dr Donald Lien. I appreciate all of your time and efforts on my behalf during this process. I would also like to thank all other faculty who have assisted, coached, and advised me through the doctoral program, especially Dr James Groff. Finally, I wish to thank my fellow classmates who have provided me encouragements and support throughout the journey and particularly Wael Aguir, Linda Campbell, Casey Martin, Rachana Kalekar, April Poe, Linxiao Liu, Sarfraz Khan, Sung-Jing Park, and Riya Xu.

Review of Accounting and Finance
Vol. 17 No. 3, 2018
pp. 341-358

1475-7702
DOI 10.1108/RAF-12-2016-0201

Following the agency cost of debt view, prior studies (Agrawal and Mandelker, 1987; Robicheaux *et al.*, 2007) have tested the hypothesis that convertible debt usage is positively associated with managerial equity and option holdings. This prediction is based on the argument that equity and option holdings increase the incentive alignment between managers and shareholders and provide management with greater risk-shifting incentives, which in turn increases agency costs of debt. However, while results on option holdings have been positive and significant consistent with predictions, findings on equity holdings have been insignificant. Further, while agency cost of debt models implicitly suggest that EPS dilution is not a major concern to executives, surveys (Graham and Harvey, 2001) and empirical evidence (Marquardt and Wiedman, 2005; Huang *et al.*, 2014) indicate that managers are concerned with EPS dilution when making financing decision. In addition, there is little evidence on any relation between managerial equity incentives and the design of convertible debt issues. This study examines the association between high managerial equity incentives and convertible debt issuance and design decisions, following the view that managers are concerned with EPS dilution.

For empirical analyses, the study tests the hypothesis that companies are less likely to choose convertible debt over straight debt and/or are more likely to design convertible debt issues as anti-dilutive to EPS when executives have high levels of equity incentives and the effect is stronger when the firm's stock price is more sensitive to diluted EPS numbers. This prediction follows from the argument that managers who own large equity incentives sell shares frequently (Ofek and Yermack, 2000). As diluted EPS numbers affect stock prices (Bens *et al.*, 2003; Huson *et al.*, 2001; Core *et al.*, 2002) and because common stock has an asymmetric payoff structure that exposes management to stock price declines, anticipated losses from future share sales can motivate executives who own large equity incentives with disincentive for EPS dilution.

Further, this study tests the hypothesis that Chief Financial Officers' (CFOs) equity incentives have a greater effect on the convertible debt design decision than Chief Executive Officers' (CEOs) equity incentives do. This prediction follows from the view that corporate decisions are typically made in teams (Aggarwal and Samwick, 2003) and often, the CFO is responsible for accounting and/or financing decisions that require specialized understanding of financial reporting issues (Chava and Purnanandam, 2007; Chava and Purnanandam, 2010). Given the complexity involved in choosing and setting various parameters that make a convertible debt issue dilutive or anti-dilutive to EPS, it is more likely that CFOs are responsible for convertible debt design decisions.

The study finds that high levels of CEOs' and CFOs' equity incentives do not have a significant impact on the likelihood that a firm chooses convertible debt over straight debt. However, firms are more likely to design convertible debt issues as anti-dilutive to EPS when CFOs have high levels of equity incentives, but only when the firm's stock price is sensitive to diluted EPS numbers. These results suggest that large equity incentives motivate executives, particularly CFOs with disincentive for EPS dilution, especially when the firm stock price is more sensitive to diluted EPS numbers. These findings are robust to control for potential self-selection bias between convertible debt and straight debt issuers.

Findings in this study contribute to the literature on the link between managerial contracting incentives, executive's disincentive for EPS dilution and firm activities. Prior studies document that EPS-based bonus incentives induce CEOs' with disincentive for EPS dilution and motivate CEOs to select less dilutive financing options (Huang *et al.*, 2014) and/or convertible debt structures (Marquardt and Wiedman, 2005) to increase diluted EPS numbers. This study shows that high equity incentives provide management with disincentive for EPS dilution and motivate executives to design convertible debt issues as anti-dilutive to EPS, especially when the firm stock price is sensitive to diluted EPS numbers.

Further, findings in this study contribute to prior research that argues CFOs' incentives have a greater influence on strategic decisions that require a more specialized understanding of financial reporting and financial decision-making. Current evidence shows that CFO stock-based incentives have a greater effect on the choices of fixed to floating rate, debt maturity and accrual management (Chava and Purnanandam, 2007; Chava and Purnanandam, 2010). This study documents that CFOs' equity incentives have a greater impact on the design of convertible debt issues.

The paper proceeds as follows: Section 2 develops the hypotheses, Section 3 presents the research design, Section 4 reports the results and Section 5 presents the conclusion.

2. Hypothesis development

Prior research (Ofek and Yermack, 2000) suggests that because managers sell shares frequently, large levels of equity incentives motivate executives to undertake enterprise activities such as earnings management to increase stock prices. Consistent with this view, Cheng and Warfield (2005) report that executives with high equity incentives are more likely to report earnings that meet or just beat analysts' forecasts and less likely to report large earnings surprises. Bergstresser and Philippon (2005) find that firms whose CEOs' compensation is more sensitive to share prices have a greater level of earnings management.

Because of the asymmetric payoff structure of managerial ownership, executives are exposed to losses from stock price declines. Hence, the frequent share selling argument suggests that executives have an incentive to avoid enterprise actions such as convertible debt financing that can potentially reduce the firm's stock price (Core *et al.*, 2002). Specifically, convertible debt financing can reduce the firm stock price at issuance by lowering diluted EPS numbers (ASC Topic 260)[1]. However, a convertible debt can be designed in such a way that the dilutive impact on EPS is reduced[2]. This study hypothesizes that high levels of equity incentives motivate management to avoid issuing convertible debt and/or to design convertible debt issues as anti-dilutive to EPS. Further, this paper argues that the effect will be stronger for firms whose stock price is more sensitive to diluted EPS numbers. The hypotheses are formally stated as follows:

H1 (issuance). Firms are less likely to issue convertible debt when managers have high equity incentives, and the effect is stronger when the firm stock price is more sensitive to diluted EPS numbers.

H2 (*design*). Firms are more likely to design a convertible debt issue as anti-dilutive to EPS when managers have high equity incentives, and the effect is stronger when the firm stock price is more sensitive to diluted EPS numbers.

Prior research that examines the effect of managerial bonus incentives on convertible debt decisions has focused on CEOs' incentives (Marquardt and Wiedman, 2005; Huang *et al.*, 2014). However, recent studies (Chava and Purnanandam, 2007; Chava and Purnanandam, 2010) suggest that CFOs exercise greater control over financing design choices, particularly when such decisions require more specialized financial and accounting judgment. The design of convertible debt (more so than the issuance) likely requires specialized accounting and/or finance expertise because it involves setting parameters such as the conversion ratio and the strike price in a way that makes the convertible bond more or less dilutive to EPS. Thus, CFOs are more likely to be in charge of convertible debt design decisions, and in that context CFOs' disincentive for EPS dilution will have a greater effect on the choice of anti-dilutive convertible designs. This leads to the prediction that CFOs' equity incentives will have a greater influence on the likelihood that a convertible debt issue is designed as anti-dilutive to EPS. The hypothesis is stated as follows:

H3 (*CFOs' versus CEOs' equity incentives*). The effect of CFOs' equity incentives on the likelihood that a firm designs a convertible debt issue as anti-dilutive to EPS is stronger than that of CEOs' equity incentives.

3. Research design and sample

3.1 Sample selection

Data are obtained from the Securities Data Corporation database, Center for Research in Security Prices (CRSP) 2012, ExecuComp 2012 and manually from proxy statements for firms that do not have executive compensation information in ExecuComp. The final sample

Year	No. of issues	Straight debt issues	Convertible issues
Panel A: Distribution of bond issues by year			
1993	47	47	0
1994	36	36	0
1995	72	72	0
1996	100	90	10
1997	106	96	10
1998	126	125	1
1999	96	93	3
2000	59	56	4
2001	91	88	3
2002	92	91	1
2003	90	88	2
2004	35	35	0
2005	46	42	4
2006	83	77	7
2007	100	91	11
2008	81	75	7
2009	153	137	16
2010	152	136	7
2011	93	87	6
2012	15	15	0
Total	*1,669*	*1,577*	*92*
Panel B: Distribution of convertible debt issues by one-digit SIC code			
1: Mining and construction			11
2: Manufacturing: paper, chemical, and allied products			25
3: Manufacturing: machinery and electronic equipment			37
5: Wholesale and retail trade			7
7: Services: business			10
8: Services: health			1
Panel C: Distribution of dilutive convertible debt issues by one-digit SIC code			
1: Mining and construction			7
2: Manufacturing: paper, chemical and allied products			8
3: Manufacturing: machinery and electronic equipment			23
5: Wholesale and retail trade			6
7: Services: business			5
8: Services: health			1

Table I.
Sample distribution

includes 1,669 bond issuances, consisting of 92 (6 per cent) convertible bond issues and 1,577 (94 per cent) straight debt issues[3].

3.2 Sample distribution

Table I presents sample distribution by year for the sample. Panel A shows that the greatest number of convertible debt issues is observed in 2009, while the largest numbers of straight debt issues are observed in 1998, 2009 and 2010. Next, Panel B reports that there is a relatively higher concentration of convertible debt issues in the manufacturing industry (SIC codes 2000-2999 and 3000-3999). Finally, Panel C shows that out of the 92 convertible debt issues, 50 (54 per cent) are dilutive and 42 (46 per cent) are anti-dilutive. Moreover, there is a relatively larger concentration of dilutive convertible debt issuers in the manufacturing industry (SIC codes 2000-2999 and 3000-3999).

3.3 Empirical specification

To test the effect of high equity incentives on convertible debt decisions, the paper estimates a Heckman (1979) two-step probit equation that corrects for potential sample selection bias between convertible debt and straight debt issuers. The need to control for sample selection bias arises because of two reasons. First, firms have the choice to issue either convertible debt or straight debt, and companies that offer convertible debt might differ in important unmeasured ways from firms that issue straight debt. Second, firms with low equity incentives might design a convertible debt issue as anti-dilutive to EPS for reasons unmeasured. If uncorrected, this selection problem can bias coefficients from a regression of dilutive convertible debt design on managerial equity incentives.

In the first step of the Heckman probit equation, the paper estimates a convertible debt issuance model (Model (1)) using the full sample of firms that have issued convertible debt and straight debt. This estimation generates the inverse mills ratio (IMR) that will be used to control for the effect of unmeasured/omitted factors in the error term. In the second step of the Heckman probit equation, the paper regresses a proxy of dilutive convertible debt design on measures of managerial equity incentives, while controlling for potential selection bias by using the IMR obtained from the issuance model (Model (2)). This second step is estimated using a reduced sample of firms that have issued convertible debt. The Heckman two-step probit equation is specified as follows:

$$\begin{aligned} Prob(CONVISSUE = 1) = Probit[&\alpha_0 + \beta_1 HICEOOWN + \beta_2 HICFOOWN \\ &+ \beta_3 HICEOOWN \times DILSENS + \beta_4 HICFOOWN \\ &\times DILSENS + \sum \delta Controls\_issue + e], \end{aligned} \tag{1}$$

$$\begin{aligned} Prob(CONVDILUTE = 1) = Probit[&\sigma_0 + \lambda_1 HICEOOWN + \lambda_2 HICFOOWN \\ &+ \lambda_3 HICEOOWN \times DILSENS + \lambda_4 HICFOOWN \\ &\times DILSENS + \sum \rho Controls\_design + e], \end{aligned} \tag{2}$$

where: the variable *CONVISSUE* equals one if a firm issued convertible debt in a particular year, and zero if the firm issued straight debt; and the variable *CONVDILUTE* equals one if

the convertible debt offering is dilutive to EPS, and zero if the convertible debt issue is anti-dilutive to EPS. To estimate whether a convertible debt issue dilutes EPS, the study follows ASC Topic 260 and calculates the conversion ratio (*CONVRATIO*) for the debt issue by dividing the after-tax interest expense by the additional number of shares assuming full conversion. If the conversion ratio is less than the reported diluted earnings per share before extraordinary items, that is, $CONVRATIO < EPSFX$, then the convertible debt offering is defined as dilutive to EPS and *CONVDILUTE* is coded as equal to one. Else, the convertible debt issue is defined as anti-dilutive to EPS and *CONVDILUTE* is coded as equal to zero.

3.4 Measurement of test variables

The test variable *HICEOOWN* (*HICFOOWN*) denotes high CEO (CFO) equity incentives. Following Burns and Kedia (2006), managerial equity incentives are estimated as the change in the value of equity holdings for a 1 per cent change in firm value, and common stock is used as indicator for equity holdings. Specifically, the number of shares of common stock held by the manager is multiplied by 1 per cent of the stock price, while assuming that the delta of common stock is equal to one, i.e. there is a one-to-one change in the value of common stock for a change in stock price. To compute *HICEOOWN* and *HICFOOWN*, a dummy variable is coded to take the value of one when the percentage of CEO (CFO) equity incentives is above the median value for the sample, and 0 otherwise. Then, this dummy variable is multiplied with the level of CEO (CFO) equity incentives.

The variable *DILSENS* denotes the stock price sensitivity to diluted EPS. To measure *DILSENS*, the study regresses stock return on firm earnings (Easton and Harris, 1991; Hayn, 1995) and estimate Model (3) below[4]:

$$R_{it} = \mu_0 + \mu_1 EPSFX_{it} + \mu_2 EPSPX_{it} + \mu_3 LEVERAGE_{it} + \mu_4 GROWTH_{it} + \mu_5 PROFITABLE_{it} + \varepsilon, \quad (3)$$

where: R_{it} is a firm's 12-month size adjusted compounded stock return starting from the fourth month of fiscal year t; *EPSFX* is the firm's diluted earnings per share before extraordinary items for year t, scaled by the stock price at the end of year $t-1$; *EPSPX* is the firm's earnings per share before extraordinary items for year t, scaled by the stock price at the end of year $t-1$; *LEVERAGE* is the firm's debt to asset ratio at the end of year t; *GROWTH* is the firm's market-to-book ratio at the end of year t; and *PROFITABLE* is the firm's ratio of earnings over sales at the end of year t. The study requires that each firm included in this regression has at least nine observations. The coefficient μ_1 measures the sensitivity of a firm's stock price to diluted EPS and is estimated for each firm over the period 1993-2012. The coefficient μ_1 is then grouped by tercile and a dummy variable *DUM* is coded to take the value of 1 for firms that belong to the highest tercile, and 0 otherwise. The variable *DILSENS* is calculated by multiplying *DUM* with the coefficient μ_1[5].

If as predicted by *H1*, high equity incentives motivate executives to avoid issuing convertible debt, then the coefficients on *HICEOOWN* and/or *HICFOOWN*, notably β_1, β_2, respectively, in Model (1) will be negative and significant. Further, if results are stronger for firms where stock prices are more sensitive to diluted EPS numbers, then the coefficients on $HICEOOWN \times DILSENS$ and $HICFOOWN \times DILSENS$, notably, β_3, β_4, respectively, in Model (1) will be negative and significant.

If as predicted by *H2*, high equity incentives motivate executives to design convertible debt issues as anti-dilutive to EPS, then the coefficients on *HICEOOWN* and/or *HICFOOWN*, notably λ_1, λ_2, respectively, in Model (2) will be negative and significant.

Further, if results are stronger for firms where stock prices are more sensitive to diluted EPS numbers, then the coefficients on *HICEOOWN* × *DILSENS* and *HICFOOWN* × *DILSENS*, notably λ_3, λ_4, respectively, in Model (2) will be negative and significant.

Finally, if as predicted by *H3*, CFOs' equity incentives have a greater impact on convertible debt design decisions than CEOs' equity incentives do, then the coefficient on *HICFOOWN* will be larger than the coefficient on *HICEOOWN*, i.e. $abs\ (\lambda_2) > abs(\lambda_1)$ in Model (2). And/or further, the coefficient on *HICFOOWN* × *DILSENS* will be larger than the coefficient on *HICEOOWN* × *DILSENS*, i.e. $abs\ (\lambda_4) > abs(\lambda_3)$ in Model (2). The operator *abs* denotes absolute value.

3.5 Control variables measurement in Model (1), the issuance model

The control variables included in Model (1) are firm size (*SIZE*), leverage (*LEVERAGE*), idiosyncratic risk (*RISKSTOCK*), growth opportunities (*GROWTH*), financial slack (*SLACK*), firm profitability (*PROFITABLE*), macroeconomic conditions (*GDPGROW*), debt maturity (*DEBTMAT*), CEO bonus incentives (*CEOBONUS*) and CFO bonus incentives (*CFOBONUS*). These variables have previously been shown or argued to affect the convertible debt issuance decision[6].

Following prior studies, larger firms are less likely to suffer from adverse selection problems (Lewis *et al.*, 1999) and, thus, have lower incentives to issue convertible debt. Firms with higher level of debt have a greater expected risk of financial distress and, thus, more incentives to issue convertible debt (Robicheaux *et al.*, 2007). Firm with high idiosyncratic risk are more susceptible to risk-shifting problems and, thus, have greater incentives to issue convertible debt (Robicheaux *et al.*, 2007). Similarly, firms with higher growth opportunities are more susceptible to risk-shifting problems (Barclay and Smith, 1995) and, thus, have greater incentives to issue convertible debt. Firms with large amounts of financial slack may face higher costs of adverse selection (Myers and Majluf, 1984) and, thus, have more incentive to issue convertible debt. More profitable firms have lower expected financial distress costs and, thus, have less incentive to issue convertible debt.

A proxy for macroeconomic conditions is included based on the view that adverse selection costs are higher in periods of economic downturn (Erel *et al.*, 2012). Hence, firms are expected to issue convertible debt when the state of the economy is poor. Because shorter debt maturity can mitigate risk-shifting problems (Brockman *et al.*, 2010), firms with longer debt maturity have greater incentives to issue convertible debt. Finally, a proxy for managerial bonus incentives is included based on the argument that bonus incentives motivate managers to avoid EPS dilution (Marquardt and Wiedman, 2005). Hence, managers with higher bonus incentives will be less likely to issue convertible debt. The measurement of all the variables included in Model (1) is presented in Panel A of Table II.

3.6 Control variables measurement in Model (2), the design model

The control variables included in Model (2) are firm size (*SIZE*), leverage (*LEVERAGE*), growth opportunities (*GROWTH*), profitability (*PROFITABLE*), debt maturity (*DEBTMAT*), recent accretive repurchase activities (*ACCREPUR*), CEO bonus incentives (*CEOBONUS*), CFO bonus incentives (*CFOBONUS*), CEO horizon (*CEOAGE*) and CFO horizon (*CFOAGE*). The selection and predictions of control variables in Model (2) are derived from considerations for the financial reporting costs of EPS dilution and risk-shifting problems[7].

Prior studies suggest that larger firms are more concerned with EPS dilution (Graham and Harvey, 2001), and thus are expected to design convertible debt issues as anti-dilutive to EPS. Firms with high levels of debt have more risk-shifting problems (Jensen and Meckling, 1976) and, thus, greater incentives to design convertible debt issues as dilutive to EPS. Similarly, firms with higher growth opportunities have more risk-shifting problems

Variables	Description
Panel A: Definition of variables used in the convertible debt issuance test	
Dependent variable	
CONVISSUE	= 1 if a firm issued convertible debt and 0 if a firm offered straight debt in a particular year
Test variables	
CEOOWN	= number of shares of equity held by the CEO multiplied by 1% of the stock price
HICEOOWN	= value of *CEOOWN* for firms with values of *CEOOWN* above the median value of the sample, and 0 otherwise
CFOOWN	= number of shares of equity held by the CFO multiplied by 1% of the stock price
HICFOOWN	= value of *CFOOWN* for firms with values of *CFOOWN* above the median value of the sample, and 0 otherwise
DILSENS	= the coefficient (*COEF*) from a regression of size-adjusted stock return on diluted EPS numbers scaled by lagged of total assets and control variables for firms in the highest tercile for the values of *COEF*, and 0 otherwise
Control variables	
SIZE	= natural logarithm of total assets in the year prior security issuance
LEVERAGE	= ratio of long-term debt to total assets in the year prior security issuance
RISKSTOCK	= standard deviation of monthly stock returns for the five years preceding the issuance year
GROWTH	= ratio of market value of equity over book value of equity at the end of the year prior to issuance of the convertible
SLACK	= sum of cash and marketable securities scaled by total assets at the end of the year prior to issuance of convertible
PROFITABLE	= ratio of earnings over sales at the end of the year prior to issuance of convertible
GDPGROW	= percentage of GDP growth in the year of the convertible debt issuance
DEBTMAT	= maturity of the debt offering
CEOBONUS	= bonus payment for the CEO in the year prior debt issuance
CFOBONUS	= bonus payment for the CFO in the year prior debt issuance
Panel B: Definition of variables used in the convertible debt design test	
Dependent variable	
CONVDILUTE	= 1 if the convertible debt issue is dilutive (anti-dilutive) to EPS and 0 otherwise. The convertible debt issue is classified as dilutive if the conversion ratio for the debt issued is less than the reported diluted earnings per share (EPS). The conversion ratio is calculated as the after-tax interest expense divided by the additional number of shares assuming full conversion
Test variables	
CEOOWN	= number of shares of equity held by the CEO multiplied by 1% of the stock price
HICEOOWN	= value of *CEOOWN* for firms with values of *CEOOWN* above the median value of the sample, and 0 otherwise
CFOOWN	= number of shares of equity held by the CFO multiplied by 1% of the stock price
HICFOOWN	= value of *CFOOWN* for firms with values of *CFOOWN* above the median value of the sample, and 0 otherwise

(*continued*)

Table II.
Description and of variables

Variables	Description
DILSENS	= the coefficient (*COEF*) from a regression of size-adjusted stock return on diluted EPS numbers scaled by lagged of total assets and control variables for firms in the highest tercile for the values of *COEF*, and 0 otherwise
Control variables	
SIZE	= natural logarithm of total assets in the year prior security issuance
LEVERAGE	= ratio of long-term debt to total assets in the year prior security issuance
GROWTH	= ratio of market value of equity over book value of equity at the end of the year prior to issuance of the convertible
PROFITABLE	= ratio of earnings over sales at the end of the year prior to issuance of convertible
DEBTMAT	= maturity of the debt offering
CEOBONUS	= bonus payment for the CEO in the year prior debt issuance
CFOBONUS	= bonus payment for the CFO in the year prior debt issuance
ACCREPUR	= 1 if *REPO* >= 0 in the year prior debt issuance and 0 otherwise. *REPO* denotes repurchases and is computed as treasury common stock (TCS) minus lag treasury CS, scaled by lag common shares outstanding if TCS is not equal to zero or not missing. Else, *REPO* equals purchase of stock from the statement of cash flows (SCF) minus sale of stock from the SCF if TCS = 0
CEOAGE	= Age of the CEO in the year of debt issuance
CFOAGE	= Age of the CFO in the year of debt issuance

Table II.

(Barclay and Smith, 1995) and, thus, greater incentives to design convertible debt issues as dilutive to EPS. To the extent past profitability proxies for better future performance, profitable firms are less willing to share earnings through EPS dilution (Kim, 1990) and, thus, are expected to design convertible debt issues as anti-dilutive to EPS. Further, firms with longer debt maturity have more risk-shifting problems (Brockman *et al.*, 2010) and, thus, greater incentives to design convertible debt issues as dilutive to EPS.

A proxy for prior accretive repurchase activities is included in Model (2) following a view (Hribar *et al.*, 2006) that firms engage into repurchase activities to increase diluted EPS numbers. To the extent accretive repurchase activities are indicative of a firm's general concern with EPS dilution, then firms that have recently undertaken accretive repurchases have lower incentives to design convertible debt issues as dilutive to EPS. Further, bonus incentives are expected to be associated with lower incentives to design convertible debt issues as dilutive to EPS (Marquardt and Wiedman, 2005). Finally, a proxy for executive horizon is included following the argument (Dechow and Sloan, 1991) that executives who are closer to retirement have incentives to boost their short-term earnings-related compensation. Hence, executives could become more sensitive to EPS dilution as they get closer to retirement and thus, are expected to design convertible debt issues as anti-dilutive to EPS. The measurement of all the variables included in Model (2) is presented in Panel B of Table II.

4. Results

4.1 Descriptive statistics for the full sample

Table III shows tests of differences in means (medians) for the full sample of 1,669 bond issues, notably 1,577 straight debt issues and 92 convertible debt issues. Interestingly in Panel A, the mean (median) value of *COUPONRATE*, the indicator for the coupon rate of the

Variables	Convertible debt issues Mean	Median	Stdev	Straight debt issues Mean	Median	Stdev	P-value T-test	Wilcoxon
Panel A: Test of differences in means and medians debt offer characteristics								
COUPONRATE	4.1425	4.0000	1.7787	6.2793	6.5000	1.7542	*0.0000*	*0.0000*
DEBTSIZE	0.2091	0.1618	0.1716	0.0569	0.0369	0.1023	*0.0000*	*0.0000*
DEBTMAT	10.1630	7.0000	8.1864	11.8186	10.000	8.7509	*0.0385*	*0.0000*
Panel B: Test of differences in means and medians executive characteristics								
CEOOWN	539.23	59.826	2264.18	573.98	104.79	2084.02	0.1548	*0.0024*
CFOOWN	19.4668	6.9786	47.5926	32.115	11.933	55.9283	2.1247	*0.0260*
CEOBONUS	257.99	11.738	433.49	818.52	447.92	1195.64	*0.0000*	*0.0000*
CFOBONUS	116.36	11.630	214.09	195.34	88.69	290.65	*0.0052*	*0.0050*
CEOAGE	54.3587	53.000	7.9926	56.007	56.000	6.1944	*0.0075*	*0.0068*
CFOAGE	49.5909	50.000	6.7426	50.342	51.000	6.2334	0.1379	0.3744
Panel C: Test of differences in means and medians firm characteristics controls								
SIZE	6.8742	6.7356	1.4732	8.8185	8.7582	1.2424	*0.0000*	*0.0000*
LEVERAGE	0.2054	0.2275	0.1645	0.2368	0.2265	0.1283	*0.0126*	0.4976
RISKSTOCK	0.1669	0.1424	0.0965	0.0898	0.0820	0.0373	*0.0000*	*0.0000*
GROWTH	3.9050	2.0034	5.0431	3.8767	2.6939	4.1814	0.5249	*0.0093*
SLACK	0.2146	0.1150	0.2525	0.0607	0.0333	0.0751	*0.0000*	*0.0000*
PROFITABLE	−0.0410	0.0270	0.2400	0.0644	0.0580	0.0932	*0.0000*	*0.0051*
GDPGROW	1.6587	2.6000	2.7084	2.3194	2.7000	2.2009	*0.0029*	0.1704
ACCREPUR	0.2314	0.0000	0.8536	0.6843	0.0000	1.7576	*0.0000*	*0.0000*
DILSENS	−337.7	−5.64	2313.8	−59.96	−26.86	944.1	*0.0152*	*0.0314*

Note: *CEOBONUS*, *CFOBONUS*, *CEOOWN*, and *CFOOWN* are measured in $1,000

Table III.
Tests of differences in means and medians between convertible debt and straight debt issuers

debt offer is 4.1425 (4.000) for convertible debt issues and is significantly lower than the mean (median) of 6.2793 (6.500) for straight debt issues. This finding is consistent with the view that attaching the conversion option to bond issues reduces the cost of debt.

In Panel B, the mean (*median*) values of *CEOOWN* and *CFOOWN* for convertible debt issuers are not significantly different from (*are significantly lower than*) those for straight debt issuers. While the median results are consistent with *H1*, one cannot rule out the effect of firm size, since larger firms might simply issue more straight debt and/or award more ownership incentives to their executives.

In Panel C, the mean (median) values of *SIZE*, *PROFITABLE* and *GDPGROW* are significantly smaller, while the mean (median) values of *RISKSTOCK* and *SLACK* are significantly larger for convertible debt issuers relative to straight debt issuers. These results are consistent with expectations. However, the mean (median) values of *LEVERAGE* and *GROWTH* are significantly lower for convertible debt issuers relative to straight debt issuers, which is inconsistent with expectations.

4.2 Descriptive statistics for the sub-sample of convertible debt issues

Table IV reports descriptive statistics for the sub-sample of 92 convertible debt issues and includes three panels: A, B and C. In Panel A, the mean (median) values of *CONVRATIO* and *COUPONRATE* between dilutive and anti-dilutive convertible debt issues are not significantly different. However, the mean (median) value of *DEBTMAT* is significantly higher (lower) for dilutive convertible debt issues, which suggests that on average dilutive convertible debt issues have longer maturity and is consistent with the risk-shifting view. In Panel B, the mean (median) values of *CEOOWN* and *CFOOWN* are not significantly

Variables	Dilutive Convertible debt issues Mean	Median	Stdev	Anti-dilutive Convertible debt issues Mean	Median	Stdev	*P*-value *T*-test	Wilcoxon
Panel A: Descriptive statistics of measures of the dilutive effect of convertible debt issues								
CONVRATIO	0.0898	0.0703	0.0628	0.0949	0.0827	0.0709	0.3515	0.9972
COUPONRATE	4.0915	4.0000	1.7281	4.4657	6.5000	1.8445	0.2985	0.1901
DEBTSIZE	0.1961	0.1618	0.1734	0.2099	0.0369	0.1677	0.6959	0.1522
DEBTMAT	11.9636	7.0000	9.2516	7.1333	10.0000	5.0163	*0.0022*	*0.0001*
Panel B: Test of differences in means and medians executive characteristics								
CEOOWN	760.556	71.885	2894.42	189.735	48.023	414.257	0.0965	0.3733
CFOOWN	21.448	6.339	56.337	16.705	7.2152	29.505	0.3056	0.8026
CEOBONUS	410.900	11.738	528.2	136.000	437.842	331.900	*0.0031*	*0.0013*
CFOBONUS	145.400	11.626	258.2	93.959	67.500	146.400	0.2371	0.1587
CEOAGE	55.382	53.000	8.5905	52.400	56.000	6.576	*0.0523*	0.2334
CFOAGE	50.789	50.000	7.1245	47.909	51.000	6.320	*0.0386*	*0.0305*
Panel C: Test of differences in means and medians firm characteristics controls								
SIZE	6.9349	6.7357	1.4401	6.9096	8.7582	1.6404	0.9358	0.4207
LEVERAGE	0.1937	0.2275	0.1575	0.2207	0.2265	0.1696	0.4128	0.4207
GROWTH	3.1776	2.0034	4.3520	4.5926	2.6939	5.3962	0.1498	0.1587
PROFITABLE	0.0473	0.0271	0.0886	−0.1468	0.0579	0.3012	*0.0000*	*0.0013*
ACCREPUR	0.2138	0.0000	0.7527	0.3502	0.0000	1.1231	0.4707	0.1091
DILSENS	−570.93	−21.652	3119.8	1.7498	−1.387	168.01	0.1943	0.0927
DEPS	−2.8862	−2.1400	2.7654	1.3984	0.9550	1.2658	*0.0000*	*0.0000*

Note: *CEOBONUS*, *CFOBONUS*, *CEOOWN*, and *CFOOWN* are measured in $1,000

Table IV. Descriptive statistics and tests of differences in means and medians between convertible debt issues that dilute EPS and convertible debt issues that are anti-dilutive to EPS

different between dilutive convertible debt issuers and anti-dilutive convertible debt issuers. In Panel C, the mean (median) values of *SIZE*, *LEVERAGE*, *GROWTH* and *ACCREPUR* are not significantly different between dilutive and anti-dilutive convertible debt issuer. However, the mean (median) values of *PROFITABLE* is significantly greater (smaller) for anti-dilutive convertible debt issuers, which is inconsistent with expectations.

4.3 Correlation analyses

Table V reports the pairwise correlations among variables used in the issuance and design analyses and includes two panels: A and B[8]. Panel A shows correlations among variables used in the issuance model, while panel B presents correlations among variables used in the design test. In both Panels A and B, the correlations between the dependent variables *CONVISSUE* (CONVDILUTE) and the tests variables, notably *HICEOOWN* and *HICFOOWN* are insignificant. Overall, the correlation results provide little support to either hypothesis one or two.

4.4 Regression results

Table VI reports the results of Model (1) in panel A, and those of Model (2) in Panel B. The Wald test of independence between Model (1) and Model (2) rejects the null of no self-selection bias at 10 per cent alpha for all regressions, which indicates the need to control for self-selection bias in the convertible debt issuance decision. Statistical inferences for all regressions are based on "robust" *t*-statistics that are adjusted for residual correlation arising from selection bias and uncertainty in the estimation of the IMR[9].

Table V.
Pearson correlation matrix

CONVISSUE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Panel A: correlations among variables used in the convertible debt issuance test														
SIZE (1)	−0.33*													
LEVERAGE (2)	−0.05*	−0.10*												
RISKSTOCK (3)	0.38*	−0.35*	0.14*											
GROWTH (4)	0.00	0.01	0.08*	−0.03										
SLACK (5)	0.35*	−0.10*	−0.25*	0.34*	0.09*									
PROFITABLE (6)	−0.22*	0.24*	−0.20*	−0.36*	0.10*	−0.09*								
GDPGROW (7)	−0.07*	−0.22*	0.05	−0.03	0.05*	−0.09*	−0.04							
DEBTMAT (8)	−0.04	0.05*	0.01	−0.14*	−0.05	−0.06*	0.03	0.14*						
CEOBONUS (9)	0.02	0.12*	0.02	−0.01	0.02	−0.05*	0.06*	0.05*	0.04					
CFOBONUS (10)	−0.06*	0.19*	−0.03	0.01	0.03	−0.04	0.09*	0.05*	−0.01	0.30*				
ACCREPUR (11)	−0.06*	0.12*	−0.07*	−0.13*	0.09*	−0.04	0.09*	−0.07*	−0.02	0.01	0.02			
DILSENS (12)	−0.06*	0.06*	0.01	−0.05*	0.02	−0.03	−0.03	−0.01	0.01	0.02	0.02	0.02		
HICEOOWN (13)	−0.01	0.07*	−0.08*	0.00	0.04	0.17*	0.10*	−0.05*	0.03	−0.01	0.00	−0.02	−0.01	
HICFOOWN (14)	0.01	0.09*	−0.04	−0.02	0.07*	0.04	0.05*	−0.02	−0.02	0.02	0.13*	0.03	0.01	0.05

CONVDILUTE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Panel B: correlations among variables used in the convertible debt design test													
SIZE (1)	0.01												
LEVERAGE (2)	−0.08	−0.10*											
GROWTH (3)	−0.15	0.01	0.08*										
PROFITABLE (4)	0.42*	0.24*	−0.20*	0.10*									
DEBTMAT (5)	0.30*	0.05*	0.01	−0.05	0.03								
CEOBONUS (6)	0.11	0.12*	0.02	0.02	0.06*	0.04							
CFOBONUS (7)	0.12	0.19*	−0.03	0.03	0.09*	−0.01	0.30*						
ACCREPUR (8)	−0.07	0.12*	−0.07*	0.09*	0.09*	−0.02	0.01	0.02					
CEOAGE (9)	0.19	0.03	0.01	−0.12*	0.01	0.06*	0.01	−0.08*	0.00				
CFOAGE (10)	0.21*	0.13*	−0.08*	−0.03	0.05*	0.03	0.01	0.14*	0.01	0.12*			
DILSENS (11)	−0.13	0.06*	0.01	0.02	−0.03	0.01	0.02	0.02	0.02	−0.03	0.01		
HICEOOWN (12)	0.13	0.07*	−0.08*	0.04	0.10*	0.03	−0.01	0.00	−0.02	0.00	−0.01	−0.01	
HICFOOWN (13)	0.08	0.09*	−0.04	0.07*	0.05*	−0.02	0.02	0.13*	0.03	−0.01	0.11*	0.01	0.05

Note: *Denotes coefficients that are significant at $p < 0.05$

Variables	Expected sign	CEO observations (a) Coef.	*z*-stat	*p*-value	CFO observations (b) Coef.	*z*-stat	*p*-value	CEO and CFO observations (c) Coef.	*z*-stat	*p*-value
Panel A: Probit model of the decision to issue convertible debt, using the full sample (dependent variable: CONVISSUE)										
Test Variables										
HICEOOWN	–	−0.006#	−0.67	0.510				−0.012#	−0.83	0.408
HICFOOWN	–				0.069#	0.20	0.840	0.223#	0.75	0.451
HICEOOWN×DILSENS	–	−0.056#	−0.48	0.635				0.013#	0.17	0.866
HICFOOWN×DILSENS	–				−4.364#	−0.41	0.680	−3.994#	−0.35	0.730
Control Variables										
SIZE	–	−0.545	−7.55	0.000	−0.565	-7.95	0.000	−0.568	−7.65	0.000
LEVERAGE	+	−0.684	−1.46	0.144	−0.729	-1.48	0.138	−0.703	−1.41	0.160
RISKSTOCK	+	6.277	4.67	0.000	5.809	4.25	0.000	5.854	4.22	0.000
GROWTH	+	−0.041	−2.38	0.017	−0.035	-1.97	0.048	−0.039	−2.07	0.038
SLACK	+	2.624	5.40	0.000	2.590	5.43	0.000	2.498	5.12	0.000
PROFITABLE	–	0.098	0.16	0.873	−0.113	−0.22	0.825	0.035	0.07	0.943
GDPGROW	–	−0.156	−5.81	0.000	−0.166	-6.21	0.000	−0.156	−5.54	0.000
DEBTMAT	+	0.013	1.32	0.185	0.013	1.30	0.194	0.013	1.30	0.192
CEOBONUS	+/–	−0.152#	−1.68	0.093				−0.365#	−2.45	0.014
CFOBONUS	+/–				0.237#	0.84	0.398	0.850#	2.51	0.012
DILSENS	–	0.090	0.36	0.717	0.120	0.41	0.679	0.126	0.44	0.663
Intercept	?	2.788	3.48	0.000	2.102	2.68	0.007	2.490	2.69	0.007
N				1648			1431			1430
Wald test of independent equations. (rho = 0)				Chi2 = 3.37			Chi2 = 7.08	Chi2 = 3.97		
Panel B: Probit model of the decision to design convertible debt issues as anti-dilutive to EPS, using the subsample of convertible debt issues (dependent variable: CONVDILUTE)										
Test Variables										
HICEOOWN	–	0.218#	2.36	0.018				0.076#	0.40	0.690
HICEOOWN×DILSENS	–	0.963#	1.13	0.258				0.025	3.07	0.002
HICFOOWN	–				0.004	1.01	0.311	0.001	0.58	0.559
HICFOOWN×DILSENS	–				−0.546	-9.86	0.000	−0.654	−6.37	0.000
Control Variables										
SIZE	–	−0.304	−2.46	0.014	−0.267	−2.01	0.045	−0.170	−1.04	0.299
LEVERAGE	+	−2.080	−1.76	0.078	-2.167	−1.90	0.057	−2.215	−1.78	0.076
GROWTH	+	−0.088	−1.36	0.174	−0.081	−1.39	0.163	−0.060	−1.03	0.303
PROFITABLE	–	1.740	2.22	0.026	1.953	2.31	0.021	1.206	1.42	0.156
DEBTMAT	+	0.047	1.96	0.051	0.047	1.81	0.070	0.053	1.81	0.056
CEOBONUS	–	1.080#	1.70	0.090				0.003	1.92	0.054
CFOBONUS	–				0.167#	−0.42	0.676	−0.004	−1.68	0.093
ACCREPUR	–	−0.223	−1.42	0.156	−0.349	−2.35	0.019	−0.232	−1.64	0.102
CEOAGE	–	0.047	2.32	0.021				0.036	1.56	0.120
CFOAGE	–				0.047	2.24	0.025	0.032	1.24	0.214
DILSENS	–	−0.998	−2.41	0.016	−0.167	−0.32	0.746	-1.707	−2.76	0.006
Intercept	?	−1.056	−0.81	0.418	-1.068	−0.78	0.435	-3.137	−1.68	0.093
Athrho	?	0.855	1.84	0.066	0.888	2.66	0.008	0.847	1.99	0.046
N			92			88			88	

(*continued*)

Table VI.
Heckman probit regression results for managerial common stock incentives tests

Variables	Expected sign	CEO observations (a) Coef.	*z*-stat	*p*-value	CFO observations (b) Coef.	*z*-stat	*p*-value	CEO and CFO observations (c) Coef.	*z*-stat	*p*-value
Chi^2			46.43			764.33			1056.98	
Model fit			$p = 0.000$			$p = 0.000$			$p = 0.000$	

Notes: In Panel A, the dependent variable *CONVISSUE* denotes convertible debt issuance and takes the value of 1 if a firm issues convertible debt and 0 otherwise. In Panel B, the dependent variable *CONVDILUTE* denotes dilutive convertible debt and it takes the value of 1 if a firm issues convertible debt that dilutes EPS and 0 otherwise. *HICEOOWN* (*HICFOOWN*) denotes firms with CEO (CFO) ownership above the median value, where managerial ownership is computed using the Burns and Kedia (2006) methodology as the number of shares of equity held by the manager multiplied by 1% of the stock price. *DILSENS* denotes the firm stock price sensitivity to diluted EPS and is computed as equal to 1 if the coefficient from a regression of size-adjusted stock return on diluted EPS numbers scaled by lagged of total assets and control variables belongs to the highest tercile grouping, and 0 otherwise. Please, see Table II for the definition of other variables. *ATHRHO* denotes the IMR and is used to control for self-selection bias in the issuance decision. Statistical inferences are based on "robust" *z*-statistics that are adjusted for residual correlation arising from pooling cross-sectional observations across time, that is, the *z*-statistics are based on White (1980) heteroskedasticity-adjusted robust variance estimates that are adjusted for issuer type clustering. Reported significance levels are based on two-tailed tests. #Coefficient is multiplied by 1,000 to ease readability

Table VI.

In Panel A of Table VI, the coefficients on the test variables *HICEOOWN*, *HICFOOWN*, *HICEOOWN* × *DILSENS* and *HICFOOWN* × *DILSENS* are insignificant across all regressions. These findings suggest that high equity incentives have no significant influence on management's decision to issue convertible debt over straight debt, even when the firm stock price is sensitive to diluted EPS numbers. In other words, *H1* is not supported.

Further, the control variables firm size (*SIZE*), idiosyncratic risk (*RISKSTOCK*), financial slack (*SLACK*) and macroeconomic condition (*GDPGROW*) are significant in the predicted directions. Moreover, growth opportunities (*GROWTH*) is negative and significant across all regressions, but this result is inconsistent with the expectation of greater risk-shifting problems at growth firms. However, leverage (*LEVERAGE*), firm profitability (*PROFITABLE*), debt maturity (*DEBTMAT*) and sensitivity of the firm stock price to diluted EPS (*DILSENS*) are insignificant.

Interestingly, CEO bonus incentives (*CEOBONUS*) are negatively associated with convertible debt issuance, consistent with expectation. However, CFO bonus incentives do not seem to have a significant impact on the anti-dilutive convertible debt issuance decision.

In Panel B of Table VI, the coefficient on *HICEOOWN* is positive and significant in regression (a), but insignificant in regression (c), and the coefficient on *HICEOOWN* × *DILSENS* is insignificant in regression (a) but is positive and significant in regression (c). These inconsistent results for the CEO suggest that high equity incentives provide CEOs with little disincentive for EPS dilution. Moreover, the coefficient on *HICFOOWN* is insignificant in all regressions, but the coefficient on *HICFOOWN* × *DILSENS* is negative and significant in both regressions (b) and (c). These CFO results suggest that firms are more likely to design convertible debt issues as anti-dilutive to EPS when CFOs have high equity incentives, but only when the firm stock price is sensitive to diluted EPS numbers, consistent with *H2*. Furthermore, the differential results for CEOs and CFOs provide support to *H3* prediction that CFOs' equity incentives have a stronger influence on convertible debt design decisions.

With respect to control variables, Panel B of Table VI shows that leverage (*LEVERAGE*) is negative and significant, contrary to expectations. Next, debt maturity (*DEBTMAT*) is positive and significant, consistent with expectations. Moreover, CEO bonus incentives (*CEOBONUS*) are positively associated with the choice of dilutive convertible debt design, contrary to expectations. In addition, the coefficient on *DILSENS* is negative and significant, suggesting that firms are less likely to design convertible debt issues as dilutive to EPS when the firm stock price is more sensitive to diluted EPS numbers. However, firm size (*SIZE*), growth opportunities (*GROWTH*), firm profitability (*PROFITABLE*), CFO bonus incentives, prior accretive repurchases (ACCREPUR), CEO horizon incentives (CEOAGE) and CFO horizon incentives (CFOAGE) are either insignificant across all regressions or have inconsistent results across regressions (a), (b), and/or (c).

4.5 Robustness check

This section assesses the sensitivity of previous results to relaxing the assumption of self-selection bias and controlling for potential influence of multicollinearity on inferences from Heckman's analyses (Lennox *et al.*, 2012). Specifically, the test consists of running logistic regressions of dilutive convertible debt design on high CEOs and CFOs' equity incentives. The results show that both high CEOs' and CFOs' equity incentives are associated with anti-dilutive convertible debt issues, but only when the stock price is more sensitive to diluted EPS[10]. Further, the coefficient on CFOs' equity incentives is larger than that on CEOs' equity incentives, suggesting that CFOs have greater influence on convertible debt design decisions. In addition, the mean VIF score is equal to 2.09 and all individual VIF scores are less than 3, except that for the interaction of CFOs' equity incentives and the stock price sensitivity to diluted EPS, which is equal to 5.01.

Overall, the results are consistent with main test findings that large equity incentives motivate management to design convertible debt issues as anti-dilutive to EPS, and CFOs have greater influence over convertible debt design decisions.

5. Conclusion

This paper tests the hypothesis that large equity incentives provide managers with disincentive for EPS dilution and thus motivate executives to avoid issuing convertible debt and/or to design convertible debt issues as anti-dilutive to EPS. Results show that firms are more likely to design convertible debt issues as anti-dilutive to EPS when CFOs have high levels of common stock incentives, but only when the firm's stock price is sensitive to diluted EPS numbers. However, high CEOs' equity incentives have limited impact of convertible debt issuance and/or design decisions.

These findings have several implications for policymakers and board of directors interested in how equity incentives influence managerial financing choices. On the one hand, managerial ownership can yield positive incentive effects by aligning management and shareholders' interests and thus can motivate executives to seek cheaper borrowing alternatives. On the other hand, it can have the side effect of increasing managerial concern for EPS dilution and thus can motivate CFOs to make anti-dilutive financing decisions, which are associated with higher borrowing costs.

A potential limitation to the generalizability of the findings and implications for this study is the smaller sample size for convertible debt issues. Future research might investigate whether current findings are supported by large samples of convertible debt issues. Further, future research could examine the association between idiosyncratic risk and the design of convertible debt.

Notes

1. According to ASC Topic 260, firms that have issued convertible debt are required to use the if-converted method to calculate diluted EPS. Under the if-converted method, the convertible bond is assumed to have been converted at the beginning of the period (or at the time of issuance if later) and the resulting common shares included in the denominator of diluted EPS calculation. Further, interest charges applicable to the convertible debt shall be added back to the numerator.
2. The if-converted method suggests that the extent to which a convertible bond is dilutive or anti-dilutive will depend on the ratio of the income adjustments because of the newly issuable shares because of convertible bond issuance.
3. Consistent with prior research (See for instance Krishnaswami and Yaman, 2008), utilities and financial firms are excluded because the motivations for issuing convertible debt by these companies might be related to regulation (for instance to show evidence of cost of capital) and there might be implicit government subsidization of the distress costs for these firms.
4. The results and inferences are similar if *LEVERAGE*, *GROWTH*, and *PROFITABLE* are not included in model (3).
5. In untabulated tests, the study uses the tercile ranking of μ_1 instead of focusing only on the highest tercile group, that is, tests include the interactions between managerial ownership and each of the three tercile groups in the regression. The inferences are similar.
6. The economic rationale for issuing convertible debt has been motivated by the risk-shifting, adverse selection and financial distress theories. The risk-shifting theory (Mikkelson, 1980) predicts that firms with high risk-shifting problems, those where shareholders have greater ability to transfer wealth from bondholders by substituting high-risk for low-risk projects (Lewis *et al.*, 1999), have more incentives to issue convertible debt. The adverse selection theory (Brennan and Kraus, 1987; Brennan and Schwartz, 1988) argues that firms have greater incentive to issue convertible debt when adverse selection costs are high. Finally, the financial distress theory predicts that firms that have greater expected costs of financial distress have greater incentives to issue convertible debt (Stein, 1992).
7. Prior research shows that convertible debt designs are not significantly affected by adverse selection costs, but could be affected by financial distress costs (Krishnaswami and Yaman, 2008).
8. For the sake of brevity, only correlation results between the dependent and test variables are discussed in this section. Nevertheless, most of the correlation results are consistent with expectations. For instance, the correlations between *CONVISSUE* and *SIZE, CONVISSUE* and *PROFITABLE*, and *CONVISSUE* and *GDPGROW* are negative, while the correlations between *CONVISSUE* and *RISKSTOCK*, and between *CONVISSUE* and *SLACK* are positive.
9. In other words, the *z*-statistics are based on White (1980) heteroskedasticity-adjusted robust variance estimates that are adjusted for convertible debt issuer clustering and uncertainty in inverse Mills ratio calculations.
10. In the main tests of Section 4.4, the association between CEOs' equity incentives and the design of convertible debt issues as anti-dilutive to EPS was insignificant.

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Corresponding author
Henri Akono can be contacted at: henri.akono@maine.edu