Available online at www.sciencedirect.com
SCIENCE DIRECT®
ELSEVIER
Journal of Banking & Finance 29 (2005) 2409–2433
Journal of BANKING & FINANCE
www.elsevier.com/locate/jbf

Employee stock options as warrants

Allan C. Eberhart *

McDonough School of Business, Georgetown University, Washington, DC 20057, United States

Received 13 January 2003; accepted 30 June 2004
Available online 29 January 2005

Abstract

Previous studies ignore the fact that employee stock options are warrants because these options have been an insignificant component of firms' capital structures. I show that this assumption is no longer correct. For example, for more than 36% of my sample firms, employee stock options represent a more significant claim on firm value than the firm's debt and preferred stock *combined*. Moreover, in contrast to the suggestions of previous research, I show that employee stock options are a significant claim on firms throughout the economy, including larger firms, older firms, and firms in "Old Economy" industries. Finally, I show that the presumption in prior studies that employee stock options are not warrants causes a potential misunderstanding of the risk-shifting interests of securityholders and biases the analysis of capital structure issues.

JEL classification: G13; G30
Keywords: Employee stock options; Capital structure; Agency theory; Corporate finance

1. Introduction

Employee stock options are issued by the employees' firm and consequently are analogous to warrants. Previous studies ignore the warrant characteristic of these options because of the implicit or explicit assumption that these options are an insignificant

* Tel.: +1 202 6874584.
E-mail address: eberhara@georgetown.edu

0378-4266/$ - see front matter
doi:10.1016/j.jbankfin.2004.06.039

component of firms' capital structures. Murphy (1985), for example, notes that dilution ratios (i.e., the ratio of employee stock options to common shares outstanding) are usually less than 1% or 2%. Ohlson (2000) argues (p. 11) that dilutive securities such as employee stock options are "... common but typically not material, with the possible exception of compensation options within certain industries (especially within the so-called "New" economy)." I show that this assumption is no longer correct.

In particular, I examine a hand-collected sample of 1821 firms with employee (i.e., executive and non-executive) stock option data available as of their 1999 fiscal year-end and make three primary contributions to the literature. First, I report that employee stock option claims are now economically significant for many firms throughout the economy, including larger firms, older firms, and firms in "Old Economy" industries. The average dilution ratio for my sample is nearly 12%, for example, and it is more than 13% for my sample firms in the Wholesale trade industry. Moreover, in contrast to the suggestions of previous research (e.g., Core and Guay (2001a), who examine an earlier sample period), I find an insignificant relation between a firm's dilution ratio and factors such as the firm's growth opportunities, period-of-listing, and cash constraint, ceteris paribus.

Second, I demonstrate that recognizing employee stock options as warrants shows that there is a direct detriment to shareholders from any incentive these options provide for managers to increase firm risk. Previous studies, in contrast, posit that volatility increases are directly beneficial to shareholders because equity is analogous to a call option on the underlying firm value (e.g., Guay, 1999). Because employee stock options are warrants, however, shareholders assume a short position in these options when they are issued by the firm. A rise in the firm return volatility consequently benefits the employee stock option holders at the expense of the shareholders, ceteris paribus. In short, recognizing employee stock options as warrants shows how a security designed to ameliorate an agency conflict can actually exacerbate it.

Third, I show the consequences of recognizing employee stock options as warrants, when these option claims are economically significant, for the measurement of a firm's capital structure (in particular, for the measurement of its default risk). As warrant holders, employee stock option owners are investors in the firm, and their claim should be recognized as part of the firm's capital structure. In contrast to other traditional investors in a firm such as common stockholders, employees do not pay cash for their options. They pay for them, for instance, by accepting lower cash compensation or putting more work into the firm. Regardless of how employees pay for their options, their issuance means the firm value is greater than the summation of the market value of its common stock, preferred stock and total debt (i.e., a traditional definition of firm value). In fact, I find that, for more than 36% of my sample firms, employee stock options represent a more significant claim on firm value than the firm's debt and preferred stock *combined*.

When I recognize employee stock options as part of a firm's capital structure, I find that the traditional debt–equity ratio measure can overstate substantially a firm's default risk. For example, my sample firms' debt–equity ratios with employee stock options in the denominator are five percentage points lower, on average, than when these options are not included in the ratios. In other words, recognizing