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The Economic and Legal Consequences of Requiring the Expensing of Employee Stock Options without Specifying the Valuation Method

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Introduction

Since the Enron collapse in mid-2002, the Financial Accounting Standards Board (FASB) has been pressed to require that companies include the hypothetical expense of their employee stock options in their GAAP financial statements. Many lawmakers and commentators on financial matters have made public statements to the effect that employee stock options are a form of compensation, and the failure to show the cost of these instruments results in misleading financial reports.¹

Prior to the renewed interest in this question, the applicable rule—embodied in Statement of Financial Accounting Standard (SFAS) 123, issued in October 1995—required that the hypothetical compensation cost of employee stock options should be recorded at “fair value” as an expense in corporate income statements.

“Fair value” is a term of art in accounting that refers generally to the price at which a willing buyer and willing seller would trade an asset.² In recent years, accounting theorists have encouraged the use of fair value estimates for the assets and liabilities, replacing valuations previously based on cost.³ Under SFAS 121, fair value can be established with reference to a market price for an asset or a liability, or—in the absence of a market—through reference to markets for similar items or “option pricing models, matrix pricing, option-adjusted spread models, and fundamental analysis.”

Because there is no reference market for employee stock options, SFAS 123 offered companies two ways of presenting their financial reports under Generally Accepted Accounting Principles (GAAP):

- A company could use an option-pricing model—SFAS 123 specifically referred to Black-Scholes or a “binomial model”—for estimating the fair value of its options; in this case, the options’ estimated value, as

¹ Bodie, Kaplan and Merton (2002) provide a recent summary of the arguments in favor of expensing options.

² In a Project Update of October 1, 2003, the FASB redefined “fair value” more precisely as “the amount at which an asset or liability could be exchanged in a current transaction between knowledgeable unrelated willing parties when neither is acting under compulsion.” The Board also noted, “All estimates of fair value should maximize market inputs (observable market prices and market assumptions) for the item being measured...In general, the more market inputs the more reliable the estimate. Reliability encompasses representational faithfulness, neutrality, and verifiability.”

³ See, generally, discussion of fair value accounting in George J. Benston, “The Quality of Corporate Financial Statements and Their Auditors before and after Enron,” Cato Institute, Policy Analysis No. 497, November 6, 2003.

established by these models, was to be deducted as an expense in computing the company's earnings per share (EPS).

- Alternatively, a company could use the so-called "intrinsic value method" for estimating the fair value of its options. This method was simply the difference between the option strike price and the value of the underlying shares on the date of grant. Since in most cases the numbers were the same, the intrinsic value method resulted in no options expense in the computation of EPS. However, if a company chose the intrinsic value method, it was required by SFAS 123 to show, in a footnote to its financial statements, the hypothetical or pro forma effect on EPS of the issuance of the options, using Black-Scholes or the binomial option-pricing model.

Since 1995, most companies have chosen to use the intrinsic value method for establishing the fair value of their employee stock options, and have used the Black-Scholes options-pricing model for making the required pro forma disclosure in the footnotes to their financial reports. Accordingly, for the most part, the EPS of public companies in the United States have not reflected the hypothetical or fair value costs of their employee stock options. Instead, this has been disclosed in the footnotes to financial statements.⁴

⁴ Reproduced below is the footnote disclosure of Morgan Stanley concerning the effect of applying SFAS 123 on its net income and EPS, as contained in its 10-K annual report for 2002:

Pro Forma Effect of SFAS No. 123. Had the Company elected to recognize compensation cost pursuant to SFAS No. 123 for its stock option plans and its employee stock purchase plan, net income would have been reduced by \$250 million, \$375 million and \$488 million for fiscal 2002, fiscal 2001 and fiscal 2000, respectively, resulting in pro forma net income and earnings per share as follows:

	Fiscal 2002	Fiscal 2001	Fiscal 2000
	(dollars in millions, except per share data)		
Net income			
As reported	\$ 2,988	\$ 3,521	\$ 5,456
Pro forma	2,738	3,146	4,968
Earnings per share			
As reported:			
Basic	\$ 2.76	\$ 3.21	\$ 4.95
Diluted	2.69	3.11	4.73
Pro forma:			
Basic	\$ 2.53	\$ 2.87	\$ 4.50
Diluted	2.45	2.76	4.29

The weighted average fair value at date of grant for stock options granted during fiscal 2002, fiscal 2001 and fiscal 2000 was \$19.42, \$26.43 and \$30.48 per option, respectively. The fair value of stock options at date of grant was estimated using the Black-Scholes option pricing model utilizing the following weighted average assumptions:

Responding to the calls for expensing stock options, the FASB readily and promptly agreed that stock options are a form of compensation and that SFAS 123 should be modified so that the value of these options would be included as an expense in computing a company's EPS. Initially, the FASB seemed to believe that this could be done rather easily through use of the Black-Scholes or binomial models, but as they have gathered more information on the accuracy and effectiveness of these models—particularly Black-Scholes—the FASB has appeared to back away from mandating the use of any particular model.⁵ In a meeting on September 10, 2003, the Board reaffirmed its determination to require the expensing of options in financial reports issued in 2005, but removed the reference to Black-Scholes or the binomial method from SFAS 123. In doing so, the Board stated that “the use of any specific option-pricing model would not be precluded.”

This suggests that FASB is prepared to require that employee stock options be expensed without actually designating the valuation method that should be used. In light of the uncertainties associated with all existing options-pricing models, one can see how FASB might adopt this approach. The Black-Scholes model, which the Board specified as one of the acceptable methods in 1995, has been shown to have significant deficiencies for valuing long term instruments such as employee stock options. For example, one recent study concluded that Black-Scholes systematically overvalues options, while another found that, *ex ante*, Black Scholes numbers did a poor job of predicting *ex post* realized costs.⁶ This is because Black-Scholes is unsuitable for valuing instruments—such as employee stock options—that are subject to a wide variety of contractual conditions and vesting arrangements, and have extremely long durations. Moreover, as described in Calomiris and Hubbard (2003) there is significant uncertainty about the proper formula or method for valuing employee stock options. Drawing on the discussion in Campbell, Lo and Mackinlay (1997) they document that uncertainty concerning the proper model of the underlying asset price is so high among financial economists, that ever more complicated and opaque methods---such as kernel density estimation and neural networks---have been utilized to provide a more accurate picture of the value of options. If financial economists are still uncertain how to value these options, FASB will undoubtedly have difficulty specifying a method. The essential difficulty is that there are many competing valuation candidates, each with pros and cons, that

	Fiscal 2002	Fiscal 2001	Fiscal 2000
Risk-free interest rate	3.8%	4.7%	5.6%
Expected option life in years	6.2	6.1	5.3
Expected stock price volatility	50.7%	48.4%	43.4%
Expected dividend yield	1.9%	1.5%	1.1%

⁵ Warren Buffet and Charles Munger recently put the Black Scholes critique quite succinctly in the Financial Times, saying, “The minute you get into longer-term options...its crazy to use Black Scholes.” Bates, (1995) concludes that “substantial biases have been found in implicit volatilities from stock options” and speculates on the causes of the observed deviations between option prices and time series.

⁶ See Financial Executive Research Foundation (2003), and Mollen, Harper and Burchman (2003)

produce widely varying results depending on the specific circumstances of individual firms.

Although the debate over whether to expense employee stock options has thus far largely turned on the question of what would be the most useful financial disclosure for investors—and whether discouraging the use of stock options would be good economic or financial policy—we believe that the absence of any reliable or accepted method for establishing the value of employee stock options raises two significant issues that undercut the FASB’s arguments for its position. First, as we note below, the absence of any satisfactory method for estimating the value of employee stock options, when combined with a requirement that this uncertain and unascertainable value be included in computing EPS, appears to be inconsistent with the principles and objectives of accounting itself and could create considerable legal risks for companies. Second, and perhaps equally important, the absence of any reliable formula for ascertaining the value of employee stock options calls into question whether any fair value analysis is appropriate for use in this context.

Use of fair value estimates, as an accounting technique, is not without controversy or troubling elements. As shown by the Enron scandal, allowing management to make its own estimates of fair value can have massively adverse consequences for the integrity of financial statements. One of the lessons of Enron is that the rules of accounting and auditing concerning fair value estimates should more effectively restrain management discretion. In the Cato analysis cited above, for example, Professor Benston notes, “The Enron experience indicates that...fair values should not be included in financial statements unless they are based on trustworthy information—prices determined by arms-length market transactions.”⁷ In this case, the FASB seems to be going in the opposite direction—loosening the already weak rules and principles by which fair value estimates are permitted. Indeed, the FASB appears to be on the verge of requiring fair value estimates before there is any known way of establishing reliable estimates.

After discussing these issues, we address the merits of the alternative—continuing the practice authorized in 1995 under SFAS 123, which permitted companies to value their outstanding employee options according to the intrinsic value method, while disclosing an estimate of the fair value cost of these options on a pro forma basis in footnotes to their financial statements.

After surveying the theoretical arguments and the evidence, we conclude that by forcing companies to place values on their employee stock options, before deciding on a method for doing so, the FASB is making a serious error that will impair the quality of financial statements, violate basic principles of accounting, and lead to a rise in costly but

⁷ Benston, *op. cit.* p. 15. In this paper, while highly critical of fair value accounting, Benston endorses the expensing of employee stock options (see p. 18). However, his position seems to be based on the assumption that the Black-Scholes options-pricing model provides a reliable and trustworthy result, a fact called into question by this paper and the companion paper by Charles Calomiris and R. Glenn Hubbard (Calomiris and Hubbard 2003).

meritless lawsuits. The more prudent and sensible course for the FASB, in our view, would be to focus its efforts on developing a satisfactory method of valuing these instruments. Only after this has been accomplished would it make sense to require that companies include the theoretical expense of employee stock options in their GAAP income statements.

Discussion and Analysis

Why the fraud in Enron should have stimulated such interest in accounting for employee stock options is something of a mystery. It is true of course that Enron, Worldcom and other companies that appear to have engaged in financial statement manipulation had large numbers of stock options outstanding, and that the executives of those companies profited handsomely from the exercise of these options and the sale of the underlying stock before investors became aware of the companies' true financial condition.

But there is no reason to believe that stock options, *per se*, were responsible for the frauds in these cases, and very good reason to believe that stock options helped create a climate that produced the enormous growth and profitability that US companies have experienced over the last 20 years. Options allow firms a unique financial opportunity. They are able to finance their human capital by exchanging options for hours worked by their employees. The alternative, providing cash or stock compensation, would require firms either to access costly external finance or confront employees with an unwelcome tax liability. If advocates of expensing stock options are taking this position because they believe it will prevent financial manipulation by managements in the future, they are making a serious mistake. It is roughly equivalent to eliminating automobiles in order to prevent highway accidents. The way to prevent managements from manipulating financial statements is to punish those who do. By making stock options less attractive to companies as a way of recruiting, retaining and incentivizing key employees, the FASB may be tinkering—needlessly and counterproductively—with a mechanism that has contributed substantially to the singular prosperity of the United States.

Indeed, there is currently a great public policy debate about just this point in Washington and before the FASB, with many companies arguing that expensing stock options will reduce their use, and thus will have an adverse effect on the growth of the US economy. This is an important question, which we believe the FASB and the public policy advocates of expensing should take seriously, but it will not be the focus of this paper. Instead, we propose to look at what technology is available for estimating the value of employee stock options and to follow out the accounting and other consequences of requiring that options be expensed before a reliable method for establishing their value is available.

Ironically, as we suggested above, the Enron affair could as easily be interpreted as requiring that fair value accounting—and hence the expensing of employee stock options—should be significantly pared back. It is doubtful that any of the public proponents of expensing stock options have considered that their advocacy would make some of the Enron abuses more likely to recur.

The conceptual roots of the drive to expense employee stock options can be found in the view that, by issuing stock options, companies are able to avoid the cash expense associated with other methods of employee compensation.⁸ Thus, a company that might have to pay \$500,000 in salary to attract an executive might be able to acquire his or her services for half that amount with an offer of stock options. From the employee's point of view the trade might be worth the difference in cash compensation because she believes that the company has good prospects for substantial share growth. The employee may also believe that she can enhance the likelihood or extent of that growth. In this example, the company has saved a hypothetical \$250,000 by issuing stock options which do not appear—as would cash salary—as an expense on its income statement. The income statement, it is argued, thus understates the company's costs in producing its income and overstates the company's real earnings.

This is a fairly straightforward idea, and has been the basis of testimony to Congress by members of the FASB,⁹ explaining why they believe the expensing of options is necessary. But as a concept this approach has significant flaws.

First, companies offer a number of intangible and unrecorded inducements to employees that may also have the effect of lowering the employers' salary obligations. Companies that are leaders in their industries—large, profitable and stable—may not have to pay as much for their executive talent as start-up companies or companies that are turn-around situations. The career risks associated with joining large and stable companies are lower than the risks of joining start-ups, and it is likely that the executives recruited to start-ups can command higher salaries because of that risk. The cash savings realized by the large and stable companies is every bit as real as the cash savings realized through the issuance of stock options, but no one is (yet) suggesting that it be valued and treated as an expense.

The same is true for companies located in or near communities with good schools, transportation, housing and cultural facilities. All of these are inducements to employees that might lower the companies' salary obligations but are not treated as expenses that companies would otherwise have had to pay if they were not so favorably located. Indeed, many companies move to places where they can more easily recruit executive or scientific talent, and the costs of the move are not treated as an employee expense even though its principal purpose was to recruit management or research talent that would have cost considerably more to lure to less favorable venues.

⁸ Core and Guay (2001) find evidence that financially constrained firms rely more heavily on stock options. However, many large and highly profitable firms rely upon them as well. This likely reflects the fact that options can serve many different functions in addition to helping firms reduce the impact of liquidity constraints, such as encouraging retention.

⁹ See Statement of Robert H. Herz, Chairman, FASB, Roundtable on "Preserving Partnership Capitalism Through Stock Options for America's Workforce," United States Senate, May 8, 2003, pp.14-18.

This is especially true if options are an effective compensation device for encouraging retention, which is often cited by managers as a key reason for their use. Employee turnover is costly to a firm in many ways, and an option may lower these expected future costs. In addition, firms with higher retention rates may be more attractive work places, lowering the required level of cash compensation that must be offered to lure desirable employees to a firm.

Since the theory is framed in terms of the value of the options in reducing the salary costs of the employer, it is not clear that some objective valuation for the options—their estimated fair value—is truly ascertainable. Fair value, by definition, is what a willing buyer and a willing seller would pay for the asset, and that is what was supposed to be measured by Black-Scholes or the binomial method, but that is not the value of the option *to the employee*. One reason for that of course is that he or she is in most cases not able to sell the option, so there is a liquidity discount that would be appropriate in valuing the option. But there are other reasons, too. A willing buyer and a willing seller would have to be considered diversified in their holdings of securities such as options. The employee is unlikely to be diversified, and thus the option represents a greater risk (the risk of non-diversification) to him than to the willing buyer—another reason for a discount from whatever value is established by Black-Scholes or some other model. On the other hand, as just mentioned, an employee may find a firm that relies more heavily on options to be a more attractive workplace.

Finally, and perhaps most significant, the employee is entering into an employment relationship with the company, and will have an opportunity to affect the value of the option that the hypothetical willing buyer in an arms length market transaction will not have. Thus, the employee may believe that her efforts on the part of the company will increase the value of the option and the underlying stock, and for this reason it is possible to argue that the option is worth more to her than it would be to a willing buyer.

All this suggests that using an option-pricing formula such as Black-Scholes—even assuming that it is capable of producing an accurate value for options with the characteristics of employee stock options—is not likely to establish a fair value for these instruments. If in fact the underlying accounting reason for expensing employee stock options is to capture the amount by which a company reduces its salary costs through use of options, that result cannot be achieved by determining the price at which a willing buyer and a willing seller would transact. In this sense, in light of the definition of fair value used in accounting texts, employee stock options are just not suitable for fair value treatment.

To be sure, the FASB takes the position—despite the anomaly discussed above—that the value they want companies to expense is not the value of the option to the employee, but the amount that the option would fetch if it could be sold to a willing buyer instead of awarded to the employee. Although this approach creates a somewhat more objective standard than the attempting to measure the value to the employee, it bears no real relationship to the theoretical basis for seeking to capture and expense the cash savings of the employer. At best, the price that a willing buyer would pay is a weak

surrogate for what the option is worth to the employee. So we have in the end a requirement to use an inadequate option-pricing model in order to determine the value of what is in any event only a shadow of the actual thing we are trying to measure. It is hard to imagine a weaker case for the use of fair value accounting.

Nevertheless, it is still possible for accounting theorists to argue that an employee stock option has *some* value—i.e., its value is not zero—and good accounting practice should recognize a value of some kind, if only to vindicate the traditional accounting concept of conservatism.¹⁰ But this would be correct only if it is consistent with other principles of accounting; however, it seems likely that a requirement for expensing options would call into question a number of other accounting concepts—particularly the requirements for reliability, comparability and consistency.

Reliability. The Statement of Financial Accounting Concepts No. 2, published by the FASB in 1980, defines reliability as “The quality of information that assures that information is reasonably free from error and bias and faithfully represents what it purports to represent.” We have already noted above that the fair value of an employee stock option—i.e., its effect in reducing the cash compensation obligations of an employer—can never be measured by a formula that attempts to estimate the price that would be paid by a willing buyer to a willing seller. Thus, that estimate of value is not one that “faithfully represents what it purports to represent.” In fact, it is at best a very rough theoretical measure of what it purports to represent, which is the amount by which a company’s cash compensation obligations are reduced by the issuance of employee stock options.

Indeed, the FASB has received a large number of comments from business organizations to the effect that the Black-Scholes method of estimating the fair value of options overstates option values. The January 31, 2003 comment of the Business Roundtable is typical. The group noted that the fair value methodology under consideration by FASB does not recognize a number of characteristics of employee options, “all of which reduce their value: (1) non-exercisability before vesting, (2) truncated term if employment terminates after vesting but before exercise, (3) inability of employees to hedge their option position or use their options as collateral, (4) ordinary income taxation of gains at exercise, and (5) for some companies grants, black-out periods, holding periods, ownership requirements, non-compete provisions and ‘claw-back’ provisions.”

Acknowledging that the FASB believes that the standard of measurement should be the value of the option if it had been sold to a willing buyer—rather than its more subjective value to the employee—the Roundtable was still concerned that no model

¹⁰ Conservatism as an accounting concept is defined in the Statement of Accounting Concepts No. 2 as “A prudent reaction to uncertainty to try to ensure that uncertainty and risks inherent in business situations are adequately considered.” In this context, it would mean that employee stock options must have some value to the company and to the employee—a value that should be recognized in the interest of appropriately discounting earnings—even though the exact amount is not known.

currently in existence could measure what an employee stock option would be worth in a hypothetical market. “Before deciding whether to propose changes to U.S. accounting standards for employee stock options,” the Roundtable cautioned, “we believe the FASB should determine whether the ‘fair value’ of employee options, as measured by adjusted option-pricing models, reasonably estimates the foregone cash the company could have received from selling options *with the same terms* to the market.” [emphasis in the original]

The Roundtable’s comment makes clear that the accounting concept of reliability would be violated through use of any known options-pricing model, since none of them take adequate account of the many ways in which the value of employee stock options can be diminished by contractual terms that would affect the price at which a willing buyer and a willing seller would transact.

Quite apart from this deficiency, as noted in this paper and in Calomiris and Hubbard (2003), even without the manifold contractual terms that alter the value of an employee stock option, there is no options-pricing model currently in existence that clearly gives the best possible assessment of the value of options across all firms. Because of these factors, whatever number is ultimately developed would have to be little more than a guess, and thus would not “faithfully represent what it purports to represent.”

Reliability is also called into question by the FASB’s failure to prescribe a model. This opens the possibility of management manipulation, also a factor in assessing reliability. In his Cato paper, Professor Benston notes that in order to be of value to investors financial statements must be based on “trustworthy” numbers. “Unfortunately,” he writes, “a financial report based on fair values can rarely be achieved within the requirement that the numbers also be trustworthy. It is often said that that there is a trade-off between trustworthiness and relevance, but information is relevant and useful for decisionmaking to the degree that it is accurate and unbiased (where the bias is not known). Therefore, trustworthy numbers are more relevant than fair values that are much more subject to managerial manipulation than are historical costs.”¹¹ Accordingly, at least with respect to the standard of reliability—or trustworthiness in Professor Benston’s terms—a fair value established for employee stock options through use of a faulty model, or one subject to management manipulation, would be less useful than no valuation at all.

It is also important to note that the FASB has itself pointed out that with respect to fair value estimates, “the more market inputs the more reliable the estimate,” and that “reliability encompasses representational fairness, neutrality, and verifiability.”¹² It is doubtful that a number derived from a wholly artificial model, which contains assumptions about an unknown future and is subject to management bias in the choice of the model utilized, meets any of these tests.

¹¹ Benston, *op. cit.*, p. 5.

¹² See note 2.

To be sure, defenders of the FASB's position have argued that employee stock options certainly have *some* value—"not zero," as some have noted—and failure to include this value in the computation of EPS is inherently misleading. But this is only a partial answer. The assets that Enron's management vastly overvalued probably also had *some* value. One of the arguments against fair value accounting is that it allows managements too much discretion in establishing the values of assets and liabilities. In principle, the FASB and the accounting profession should be resisting efforts to break down the standards for how fair value can be established, not requiring companies to include in their EPS numbers for which there is no adequate conceptual basis. It is not necessarily an improvement in financial reporting to substitute an arbitrary value when the actual value cannot be ascertained. Doing so impairs the credibility and trustworthiness of the financial statement, and certainly does not meet the accounting test of reliability—i.e., "faithfully representing what it purports to represent."

Consistency. The Statement of Financial Accounting Concepts No. 2 defines "consistency" as "conformity from period to period with unchanging policies and procedures." This concept would also be violated by an FASB requirement that companies estimate the fair value of their employee stock options before there is in place an agreed technology for doing so. In the minutes of a meeting on September 10, 2003, the FASB made clear that no preferred or accepted method for valuing employee stock options currently exists. The Board deleted the references to Black-Scholes and the binomial method from SFAS 123 and is recorded as deciding that "the use of any specific option-pricing model would not be precluded." The inability of the Board to specify a particular model has significant consequences that will be discussed below under "Comparability," but the absence of any accepted standard or method also has significant consequences for the concept of consistency.

Under the consistency concept in accounting, a company is supposed to report its results from period to period without changing its policies and procedures. This principle works where policies and procedures remain unchanged for extended periods, but is useless if there is a constant updating and modification required by changing accounting rules. The Board's September 10 discussion of company obligations reflects a view of at least some members of the Board that the technology of options-pricing would improve in the future. For example, according to the minutes, in a discussion of the consequences of permitting the use of models other than Black-Scholes, Board member Edward W. Trott noted that other models might be developed that would improve on Black-Scholes: "a more robust and dynamic valuation model could incorporate better information and allow for improvement of information and modeling techniques over time."

This view is likely to have been the basis for the Board's decision to reduce the focus on the Black-Scholes and the binomial model as the accepted option-pricing technologies. But leaving open the choice of models not only leaves open the possibility of management manipulation in the choice of model, it also creates the prospect that companies will be required to change modeling techniques as the technology improves over time, and this will clearly disrupt consistency of presentation.

More troubling is the position of the company that adopts one method for estimating the value of its employee stock options, but finds as it proceeds from year to year that the standard used by others—perhaps others in its industry—has changed. A new method may have been introduced that is deemed superior. Would the company be required to change the pricing model it has been using, and thus change its EPS computation? If it did this, would it be required to restate its net income and EPS for all the preceding years in which it had used the older and presumably inferior model? Later in this paper, we discuss the legal implications of such a change, but for present purposes we note only that an evolving standard for what is the proper way to estimate the fair value of employee stock options is a serious threat to the accounting concept of consistency of presentation.

Comparability. The accounting concept of comparability is defined as “the quality of information that enables users to identify similarities in and differences between two sets of economic phenomena.” For investors, adherence to the concept of comparability is essential to the process of comparing the financial results of two or more companies. Obviously, the entire conceptual structure of accounting in the United States, the collection of rules known as Generally Accepted Accounting Principles (GAAP), was developed in order to assure that companies prepare and publish their financial reports under the same set of rules. Without that, it would not be possible to compare one company with another, or even to compare a company’s results in one year with those in a preceding or subsequent year.

The possibility that the FASB might require companies to estimate the value of their employee stock options without specifying a particular method for doing so presents a unique challenge to the concept of comparability. In order to compare the GAAP financial results of any two companies, investors will have to understand the options-pricing model the companies used as well as the inputs to that model. This would be a difficult process even if a particular model were specified, because investors would have to evaluate whether the values the company selected for inclusion in the model were appropriate, given the company’s history and circumstances. The process would be even more difficult if the companies chose entirely different option-pricing models for this purpose.

For example, those companies that chose to use the intrinsic value method of estimating the fair value of their employee stock options have been required since the promulgation of SFAS 123 in 1995 to provide supplemental information in the footnotes to their financial statements about the assumptions they used as inputs to the model. Most have used the Black-Scholes model, and their inputs have included assumptions concerning the expected volatility of their stock, the risk-free interest rate at the date of grant, the expected option life in years, and the expected dividend yield on their stock. Several of these are obviously extremely difficult to estimate and involve unknowable future events. In reviewing various corporate financial reports it becomes clear that companies chose substantially different estimates of volatility and expected option life. Different choices for these two values can have a major impact on the expense that is attributable to employee stock options.

This example even assumes that the model chosen is correct. In practice, the underlying assumption that the share price follows a geometric brownian motion has been demonstrated time and again to be a crude simplification (this literature dates back all the way to Mandelbrot, 1963. See Lo and Mackinlay, 1990, for a more recent contribution.) As discussed in Calomiris and Hubbard (2003), even relatively small errors in the modeling of the serial correlation of returns over time can lead Black-Scholes estimates to be off by a factor of two. Small errors are highly likely given the volatile nature of stocks, and option models have not held up particularly well when confronted with the empirical data. Bates (1995) reviews the empirical literature and concludes that “substantial biases have been found in implicit volatilities from stock and stock index options.”¹³ These problems suggest that reasonable and well trained options practitioners might go about the valuation process in different ways, choose significantly different models and arrive at significantly different values.

Under these circumstances, it would be important for investors to be able to assess the appropriateness and validity of the inputs selected by any two companies they wish to compare, but very difficult for them to do so. Assuming both companies use the Black-Scholes model, the investor might understand how the model works, but be unable to determine whether the input assumptions were reasonable. It would be a still harder task if the companies did not even use the same model—a possibility that is suggested by the FASB’s recent decision that “the use of any specific option-pricing model would not be precluded.”

Two simple examples can help emphasize how significant these issues may be. Figure 1 provides a stock chart for Amazon.com and Figure 2 provides a stock chart for Pepsi. The Amazon chart visually looks like the data generating process might well have the form of a random walk with drift, aligning with the assumptions of the Black-Scholes model. If one used data from 2001 to make an assessment of the likely future trend and volatility of the stock price, then one would have made a reasonable projection of the path of the stock’s price in 2002. Aside from all of the special issues such as nontransferability, etc., a valuation model based on a random walk (Brownian motion) assumption might well have provided an answer in 2002 that was accurate. However, Figure 2, which provides a chart that is fairly typical, tells a completely different story. The stock appears to have periods of quiescence followed by periods of high volatility (conditional heteroskedasticity). If one based one’s projections of trend and volatility on the period from April 2001 to April 2002, then one would have wildly misstated the path and volatility of the share price subsequently. Parameters that one might plug into a simple option formula would have changed dramatically, as would the value of forward looking options.

Over time the profession may converge to a model of the data generating process and the option itself that does not vary so significantly across time and firms. While this is consistent with the idea that option-pricing technology will improve over time—a

¹³ Bates (1995), p.60.

notion that seems to underlie the Board's determination to proceed—it creates a highly uncertain landscape for both companies and investors. With a wide variety of option-pricing models in use, investors will be unable to make effective comparisons of bottom line GAAP results.

Legal risks. As discussed in many of the comments to the FASB, and in the balance of this paper, neither of the two models which the Board initially seemed to endorse—the Black-Scholes and binomial models—has been found effective. Instead, Board has decided not to endorse a particular model, but to leave the choice up to companies and their auditors. This state of affairs creates a serious legal risk for both companies and auditors to which the Board seems oblivious. In the absence of a designated and approved method for valuing employee stock options, companies will have to make choices, not only about the model to be used but the various inputs that the model requires. These choices can have a substantial impact on the reported earnings of a company, and that in turn can leave companies open to class action lawsuits by disgruntled shareholders.

As an example, consider a company that chooses a model and makes input assumptions that reduce its reported earnings by 5 percent each year for a ten year period. At the end of that period, looking back over the actual experience of the company, one of the following becomes clear: (i) the expense it charged to earnings was less than what its options-pricing model would have required if the inputs to the model had borne a closer resemblance to its actual experience; (ii) the options-pricing model it used was less accurate than other models that were available at the time it adopted its model; or (iii) the technology for options-pricing had evolved over the 10 year period, so that the company's model—at the state of the art when adopted—had been superseded by superior models. Any of these facts will expose the company to lawsuits based on the allegation that its earnings were overstated over many years. Shareholders who purchased shares during this period might have a cause of action based on the company's failure to correctly calculate its employee options costs.

While it is true that the securities laws require some demonstration of *scienter*—intent to mislead—before liability will attach, in the real world companies are constantly challenged with lawsuits on facts far flimsier than those recited above. And they are frequently driven to settle these suits because of the drain on management time, the adverse publicity these suits produce, or the fact that large corporations are generally unsympathetic defendants in jury trials.

Circumstances might be considerably different if the FASB were in a position to specify an options-pricing model that would be acceptable for all companies. In that case, the company would at least have the defense that it did not adopt a particular model in order to achieve favorable earnings results. However, it does not appear that the FASB is able to specify an options-pricing model, and will leave it to companies to select or develop their own models. In a sense, this is the worst of all possible worlds for public companies. They are required to estimate an important component of their EPS—the most sensitive element of their financial reports—and yet they are left without any sense

of how to do it. This situation creates low hanging fruit, ripe for plucking by the class action bar.

In summary, it seems clear that the FASB has no idea how companies might be able to establish the fair value of employee stock options, but is nevertheless proceeding down the path toward requiring the expensing of options. In part, this may be the result of political pressure that originated with a misreading of the Enron and Worldcom debacles. The responsible course, consistent with the accounting concepts of reliability, consistency and comparability, would be for the Board to wait until it or some other entity has created a model for pricing employee stock options that is generally recognized as “faithfully representing what it purports to represent.” To do less would open up a Pandora’s box of potential lawsuits, and expose firms to vexing terrain that may adversely affect both the quality of their financial reports and the results of their operations.

In this light, it is worth noting that the current system of disclosure has much to recommend it. Given the uncertainty associated with estimating the fair value of employee stock options, it seems appropriate that disclosure occur in the footnotes to the financial statements rather than in the computation of net income. In this case, investors who are interested in what effect a company’s employee stock options might have on its earnings per share can see an estimate in the footnotes, but because of the uncertainty associated with the estimate—most are now made using the inadequate Black-Scholes model—companies will not be distorting their EPS with a weakly derived number. This seems a sensible compromise—until the FASB is able to settle on an adequate and reliable method for ascertaining the fair value of employee stock options.

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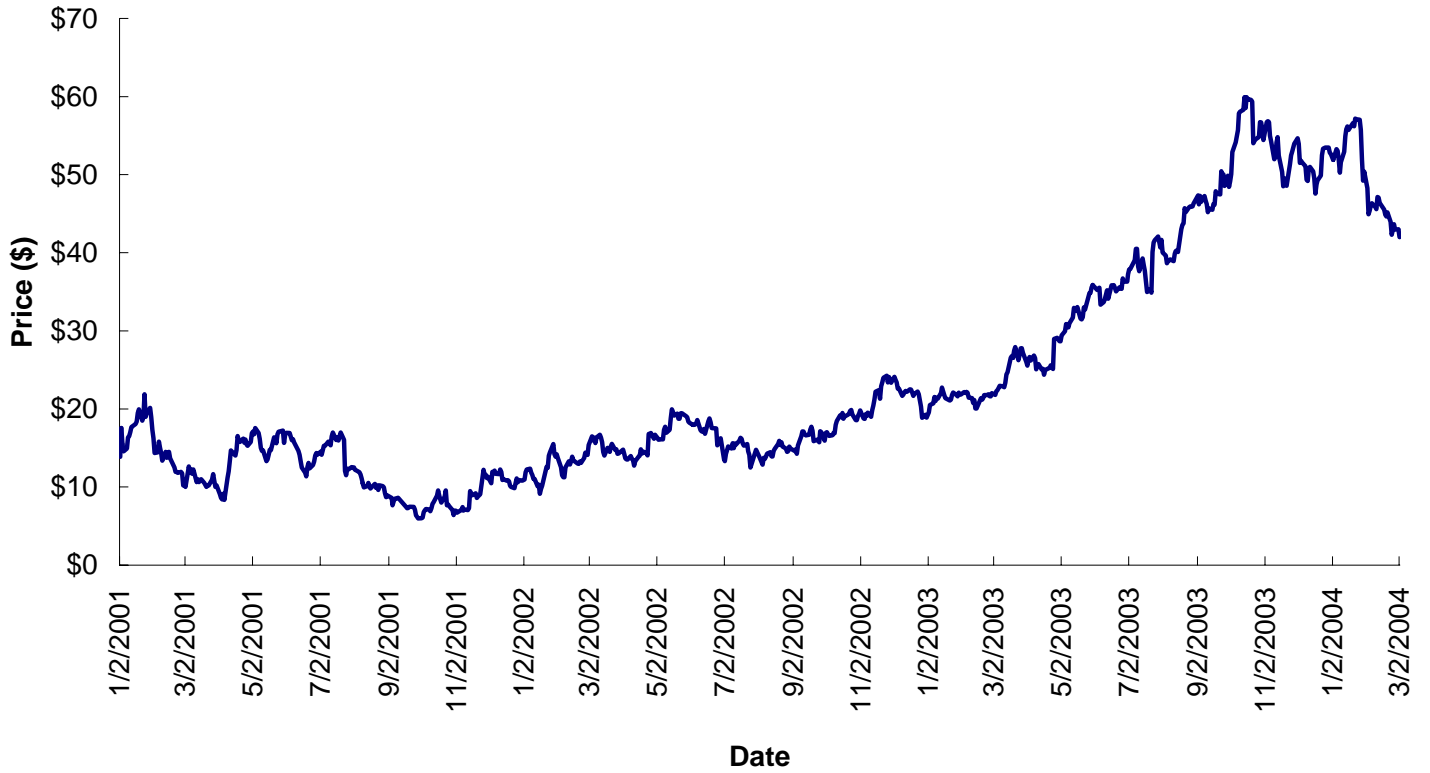
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Amazon Stock Price (2001-Present)



Pepsico Inc. Stock Price (2001-Present)

