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New economy accounting : why are broad-based stock option plans so attractive?

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Non-Technical Summary

In recent years stock option plans have become a substantial part of compensation schemes in U.S. companies. While in the beginning companies granted options only to the top-management more and more companies offer broad-based stock option plans. For these plans more than 50 percent of the employees are eligible. It is well known that stock option plans are suitable to bring employees' interests in line with shareholders' interests, since due to these option plans their income is linked to shareholders' wealth. But it is still an open question why stock option programs are more popular than similar performance-based compensation schemes. This paper proposes an answer: Because of the actual accounting rules in the USA, companies are able to hide the labor-cost resulting from stock option plans. More precisely, the U.S. Generally Accepted Accounting Principles (US-GAAP) require no charge to earnings for specifically designed stock option plans if a company opts for footnote disclosure. Thus, using such stock option plans companies' earnings are higher than with similar performance-based compensation schemes, even though economically they are the same. Based on a case study of 20 companies out of the SP 500 which rely heavily on employee stock options we arrive at the conclusion that the amount of hidden compensation cost can reach economically significant amounts. Hence, this hidden labor-cost component should not be neglected either by academic nor by applied investment research, since the analysis of a firm's earnings power may be considerably biased. But, this topic seems to be widely neglected and thus it is questionable whether stock prices reflect these

hidden cost and whether academic research results are partly driven by this misrepresentation of earnings.

New Economy accounting: Why are broad-based stock option plans so attractive? *

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Abstract

Several studies indicate that stock option plans are becoming more and more a substantial part of compensation schemes in U.S. companies. This paper shows the tax implications and accounting rules for stock option plans. By comparison of the tax and accounting rules for different compensation schemes we show that the popularity of stock options may be mainly due to the U.S. Generally Accepted Accounting Principles (US-GAAP) which require no charge to earnings for specifically designed stock option plans if a company opts for footnote disclosure. Thus, for these companies the stated earnings are higher than their economical situations justify. Based on a case study of 20 companies out of the S&P 500 which rely heavily on employee stock options we arrive at the conclusion that the amount of hidden compensation cost can reach economically significant amounts. Since this topic seems to be widely neglected it is questionable whether stock prices reflect these hidden cost.

Keywords: Accounting, US-GAAP, stock option programs

JEL classification: M 41, G 0

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1 Introduction

Traditionally, stock options were awarded exclusively to top-management in order to link their interests with those of shareholders. More recently, companies have begun to provide stock option plans also for "key" employees. According to the National Center for Employee Ownership (NCEO) "more and more companies consider all of their employees as 'key'" and offer broad-based stock option plans, i.e. plans for which more than 50 percent of employees are eligible. The NCEO estimates that seven to ten million employees receive stock options as of May 2000, up from around 1 million in 1991. Moreover, the number of options granted has reached considerable amounts in the meantime. For example, a recent Federal Reserve Board (FED) study shows that average annual stock option grants of the S&P 500 companies exceeded one percent of outstanding shares during the period 1994 to 1998 (see Liang and Sharpe 1999).[1] Several studies show that stock options are the most popular instrument to attract and retain highly specialized personal – at a time when companies in the U.S.

[1] Note that this number varies considerably among individual companies. Moreover, Liang and Sharpe (1999) find that companies already spend around 40% of their cash flow in order to buy back shares. Their study is based on 150 of the largest domestic S&P 500 companies. See also Callies and Sareen (2000).

are confronted with the tightest labor market in more than a decade.[2] Economically speaking, stock option plans are just another wage component given as a substitute for cash payments. Why are stock option plans so attractive? What makes them preferable to cash incentives? This paper suggests that the main reason can be found in the U.S. Generally Accepted Accounting Principles (US-GAAP). They require cash payments to be recognized as compensation cost while fringe benefits in the form of specifically designed stock option plans may go unrecognized. However, if a part of the cost is omitted earnings are overstated. Therefore, this paper compares income as stated with income on the basis of total compensation cost accrual. Looking at some companies which use stock option plans extensively, we ask whether the misrepresentation of earnings by "income as stated" can reach economically significant amounts.

Arriving at the conclusion that employee stock options are valuable and represent compensation the Financial Accounting Standards Board (FASB) "encourages" all entities in its Statement No. 123 (FAS 123) to measure the cost by the "fair value method". Companies should measure compensation cost at the grant date using an option pricing model such as Black-Scholes and recognize this cost

[2]See, for example, NCEO (1999).

ratably over the service period. Nevertheless, FAS 123 allows companies to continue recognizing compensation cost by the "intrinsic value method" of Accounting Principal Board Opinion No. 25 (APB 25). Since exercise prices are usually chosen at the current stock price or slightly above, the intrinsic value is zero and, thus, no compensation cost at all has to be recognized under this method and the bottom line, i.e. "net income as stated", is not affected.

However, additional disclosures are required if a company elects to follow ABP 25. It has to disclose a "pro forma net income" based on the fair value method in the notes of annual statements. In capital markets that process information efficiently one would expect that these FAS 123 complient pro forma income figures capture the headlines anyway. On the contrary, what you see frequently is pro forma income adjusted for one-time charges such as merger related costs or investment income. Pro forma figures that account for compensation cost of option plans rarely show up at all in the financial press. For example, I/B/E/S [3] forecasts are based on income from continuing operations. No adjustment is made for omitted compensation cost.[4] While pro forma figures reflecting compensation cost of option plans have to be disclosed within the notes of annual reports (e.g. 10-K forms) such a

[3] I/B/E/S International Inc. is a global financial information services company.

[4] See e.g. I/B/E/S (1999).

disclosure is not required for quarterly reports (10-Q forms). Moreover, reported earnings per share figures or price earnings ratios are almost always based on (operating) net income as stated rather than on pro forma net income according to FAS 123.

One rationale for the existence of stock option plans is provided by agency theory which shows that convex payout functions are suitable to bring managers' interests in line with shareholders' interests. While agency theory focuses largely on executive compensation, the same arguments should apply to a wide range of nonmanagement employees, especially those who are key to a company's success. However, in an agency framework no distinction would be made between a cash bonus plan and a stock option plan if both instruments provide identical payouts .Stock appreciation rights may serve as an good example since they offer the same convex payout structure as stock options but they are paid in cash. From an agency theory point of view it makes no sense to hide performance-based wage components from income statements by following APB 25 as long as investors are able to infer compensation cost associated with option grants from pro forma disclosures.

In order to evaluate the impact of options on stated earnings some studies have looked at the gains managers as well as ordinary employees have received recently from exercising their options. For example,

surveying 96 companies that grant options to more than half of their employees, the NCEO finds that employees usually obtain between 12% and 20% of their regular salaries from exercising their options.[5] Looking at the S&P 500 companies, a recent study by UBS Warbug finds that for more than one fifth of the S&P 500 companies the ratio of total outstanding stock options to total outstanding shares exceeds 10%.[6] As of June 30, 2000, the net exercise gain on all outstanding options amounts to $570 billion, or 14.6% of total wages and salaries of these companies. Looking at the 50 technology firms within the S&P exercise gains on options granted by these companies alone accounts for $330 billion.

Exercise gains may provide an explanation for the gap in the development of the Department of Labor's data on wages and salaries and the income tax data. However, exercise gains do not correctly reflect the compensation cost of options. Rather than giving options to its employees a company could sell those options provided there is a market. This is exactly the amount a company should recognize as compensation cost over the service period. Since such a market does not exist, a reasonable proxy for the compensation cost is given by an appro-

[5]See NCEO (1999).

[6]See Carson (2000). These numbers include all stock options - whether they are fully vested or not - given to nonmanagers as well as to managers.

priate option pricing model as it is suggested by FAS 123. Whether the buyers of these options make money or not is irrelevant for measuring compensation cost. Relevant is the value of the options at the time employees are promised to receive this "gift" if they stay with the company.

The structure of this paper is as follows. Section 2 briefly describes the properties of widely used stock option plans and asks whether favorable tax or accounting rules may help to explain their popularity. Companies reporting under US-GAAP may design employee stock option plans such that net income as stated is not affected by the compensation cost associated with these instruments. Some examples are presented in section 3 in order to illustrate the calculation of hidden compensation cost. Section 4 asks whether this cost component may reach economically significant amounts by investigating recent annual reports of a sample of S&P 500 companies that use stock option compensation extensively. Section 5 concludes.

2 Accounting and taxation of stock option plans

Various types of options may be granted under executive and nonmangement employee stock option plans, but the most popular type

is a plain vanilla call option.[7] In order to qualify as an incentive stock option under the Internal Revenue Code (IRC) an option must be exercisable within ten years of grant. Typically, options expire within seven to ten years after grant.[8] Among other reasons, options are given in order to retain an employee for a certain period. Therefore, it is required that she remains in the employment of the company until the options get vested[9]. During this so-called service period she is not able to exercise the options. Most of the companies install cliff vesting, i.e. all options vest after a fixed period, typically three to five years. Other companies grant options which vest in certain installments over the service period (graded vesting). For example, Yahoo!'s options "generally vest 25% after the first year of service and ratably each month over the remaining thirty-six month period".[10]

[7]See NCEO (1999) for a study of nonmanagement plans. For an overview of nontraditional types of executive stock options see e.g. Paulin (1992) or Johnson and Tian (2000).

[8]See, for example, NCEO (1999) for nonmanagement stock option plans and Murphy (1996) for executive plans.

[9]An option gets vested if an employee has to render no additional service in order to earn the right to benefit from the option (FAS 123.27). Usually, an employee option is immediately exercisable after it is vested.

[10]See Yahoo!'s 1999 10-K form filed with the SEC March 30, 2000. "As of December 31, 1999, [Yahoo!] had fourteen stock-based compensation plans." The above cited rule applys to annual option grants to employees of the company while "non-employee directors" receive a "First Option" upon nomination which vests in equal monthly installments over four years and an "Annual Option" which vests at the end of four years.

2.1 Tax implications

In the following we describe briefly tax effects of stock option plans and we ask whether they may explain the popularity of these plans. For tax purposes two types of stock option plans are distinguished, incentive stock options (ISO) and non-qualified stock options (NSO). An incentive stock option plan, which is also called a qualified or statutory plan, receives special treatment under the Internal Revenue Code. Rather than paying income tax at exercise, an employee pays capital gains tax at the time the stock is sold. To receive this treatment certain criteria have to be met: In particular, the stock may not be sold within two years after grant and one year after exercise. Since this is non-wage income the company does not have to withhold payroll tax and no social security and medicare taxes are due. On the other hand, the employer may not take a tax deduction. In a non-qualified (or non-statutory) stock option plan there are no statutory requirements to be met. Such an option would be taxed at grant if it has a readily ascertainable fair market value (Code section 83 a). Since these options usually are not tradeable, they are taxed at exercise. The employee pays ordinary income tax on the spread between the stock price at exercise and the option's exercise price. Both, employee and employer have to pay medicare taxes on this spread, and

in addition, social security if the employee is not already above the social security maximum. However, these amounts should be relatively small. In contrast to an ISO, with an NSO the company gets a tax deduction at the time the option is exercised. This deduction is equal to the gain recognized by the employee. If the statutory requirement of an ISO are not met, especially if the employee disposes of the stock too early, a "disqualifying disposition" occurs and the tax implications become similar to that of a NSO. While the exercise gain would still be treated as non-wage income, the employer gets the tax deduction on that gain.

The NCEO points out that an ISO might be preferable for some employees who want to take advantage of a lower marginal capital gains tax rate compared to their income tax rate. Others simply lack the cash to pay for the stock and therefore dispose of the stock right after exercise. If the majority of employees engage in disqualifying dispositions, the tax benefit for the employer should be largely the same for both types of plans. Then, there would be no major tax advantages in favor of one of the plans and we would presume to see both plans being implemented largely. In fact, 19 out of the 20 companies in our study provide both, incentive and non-qualified stock option plans.

Basically, stock option plans substitute a part of wages otherwise paid

in cash during the service period. This lowers costs and increases income, and thus, more taxes have to be paid. If the plan is non-qualified, the employer is allowed to deduct the exercise gain of his employee at exercise, resulting in lower tax payments. For simplicity, assume a one-year service period. Let S_0 denote the stock price at grant and X the strike price of the option. Lowering his costs by the fair value of the option at grant, C_0, the tax burden of the employer increases by $\tau\, C_0$ in the first period, where τ denotes its effective tax rate. If the employee exercises the option in the next period, the employer gets a tax benefit of the difference of the strike price C_0 and the stock price at exercise, say S_T, if this difference is positive. Thus, its tax burden in the second period decreases by $\tau\, max(0, S_T - X)$. Since this is exactly τ times the cash flow of an ordinary option, we may interpret a stock option plan as follows: The employer "buys" τ options from the Internal Revenue Service paying the fair value $\tau\, C_0$ at grant. At exercise, he receives the payout of his tax option, i.e. a tax break in the amount of $\tau\, max(0, S_T - X)$. Thus, if he has paid the fair value this is just a fair game and he is not able to profit on the account of the IRS. Usually the option price is not "paid" at grant but ratably over the service period. This may allow the employer to realize a small interest gain. On the other hand, if he grants incentive options and not all employees

engage in disqualifying dispositions he looses part of the final payout. Thus, tax advantages of stock option plans seem to be small at best. Therefore, the next section analyzes whether accounting rules provide a better explanation for the wide-spread use of stock options.

2.2 Accounting for stock option plans

Statement No. 123 "Accounting for Stock-Based Compensation" (FAS 123) was issued in October 1995 by the Financial Accounting Standards Board. It governs a variety of stock-based employee compensation plans including stock purchase plans [11] , stock options, restricted stock, and stock appreciation rights. While FAS 123 encourages companies to measure the cost of stock-based compensation by the "fair value method", they are also permitted to continue recognizing compensation cost by the "intrinsic value method" of the Accounting Principal Board Opinion No. 25 "Accounting for Stock Issued to Employees" (APB 25).

APB 25 distinguishes between noncompensatory plans (APB 25.7) and compensatory plans (APB 25.8–25.10). Basically, stock purchase plans with reasonably small discounts (usually less than 5% of the

[11] Stock purchase plans offer employees the possibility to buy stocks of the company at a price which is lower than the actual market price

actual stock price) qualify as noncompensatory plans, stock option plans go under the label compensatory plans. It is important to note that even compensatory plans do not necessarily require to recognize compensation cost (APB 25.10). Compensation is measured by the intrinsic value of an instrument at the so-called measurement date. For an option the intrinsic value is the amount by which the quoted market price of the stock at the measurement date exceeds the strike price. The measurement date varies with the type of option. According to APB 25.10.b, this is the first date for which both, the number of shares and the exercise price are known. For a so-called fixed plan this is known at grant. So, if the exercise price is set equal to the stock price at grant or higher (at- or out-of-the-money calls), then no compensation cost at all has to be recognized. In contrast, for plans with variable terms the measurement date can be considerably later than the grant date. By then the option may have a positive intrinsic value and thus require a recognition of compensation cost. A performance-based plan in which the number of shares is contingent on performance thresholds may serve as an example. The consideration, if there is any, has to be recognized ratably over the service period, i.e. between the grant date and the date the options get vested (APB 25.12).

If a company follows FAS 123, it would have to measure compensation cost applying an appropriate option pricing model, "for example, the Black-Scholes model or a binomial model" (FAS 123.19). The parameters of the model have to be fixed at grant date, especially the risk-free rate, the expected dividend rate, and the expected volatility. Instead of using the actual maturity of the option, it is recommended to use the expected life, i.e. the estimated time until exercise (FAS 123.19, see also appendix B of FAS 123). These estimates introduce some arbitrariness into the recognition of compensation cost.[12] Nevertheless, from a shareholder's point of view it is preferable that companies show estimated fair option values rather than to recognize no compensation cost at all.

According to FAS 123.26, compensation cost has to be based on the expected number of options that vest. No compensation cost is required for options that are forfeited either because an employee leaves the company or because a performance criterion is not met. However, if an already vested option expires worthless previously recognized compensation cost may not be reversed. Measured compensation cost

[12] Investigating disclosures of executive stock option values in proxy statements, Yermack (1998) finds that companies tend to exploit the flexibility of regulations. For example, they shorten the expected lives of options and thus try to reduce the apparent value of manager compensation. Yermack suspects that companies might also try to curb displayed employee compensation.

has to be recognized ratably over the service period (FAS 123.27-30). For stock option plans with cliff vesting the same amount has to be recognized for each year. Using a graded vesting schedule, compensation cost is calculated as if a series of cliff vesting awards was given rather than a single award (FAS 123.31 and FASB Interpretation 28). Thus, graded vesting implies that a higher cost figure is reported in earlier years than in later years.

Regardless whether APB 25 or FAS 123 is applied, entities have to include certain disclosures about stock options in their annual financial statements for fiscal years beginning after December 15, 1995 (FAS 123.45, 123.51). In particular, the number of options granted, the "fair value" of these options, and the assumptions underlying the computation of the fair value have to be disclosed (FAS 123.47). Moreover, entities that apply the "intrinsic value" approach have to display a "pro forma net income" as well as "pro forma earnings per share" in the notes which has to be calculated as if the company had applied the "intrinsic value" method (FAS 123.45). While these additional disclosures are required in annual statements, they have not to be included in quarterly reports (10-Q forms).

To sum up, a major "advantage" of stock option plans may be found in the fact that companies do not have to recognize part of employee

compensation cost if they follow APB 25. However, if investors pay attention to the additional disclosures required in annual statements the company could not hide costs by following APB 25. Nevertheless, if a company follows FAS 123 compensation cost of stock options would also show up in quarterly reports. Thus following APB 25 companies are able to retain this information during the year. This is certainly not appreciated by investors, especially if the hidden cost component reaches economically significant amounts. Therefore, we would expect that companies follow the fair value approach of FAS 123 in order to avoid being suspected of hiding some part of compensation cost. However, this is not the case as we will see later.

3 Accruals of compensation cost

Before we evaluate the magnitude of hidden compensation cost in the next section, this section provides a detailed description of how compensation costs should be accrued under FAS 123. Investors may wish to know how much future earnings are affected by a particular option grant. Therefore, in the first example we analyze how much a one-time grant may cost in subsequent periods. Since this depends on the vesting schedule, two alternative vesting schedules are analyzed: cliff

and graded vesting. However, one-time grants are the exception rather than the rule. Therefore, a second example demonstrates the calculation of total compensation cost in a particular period accounting for grants given in previous years. For simplicity, we assume in all the examples that options are granted at the end of a financial year.

Table 1 displays the percentage of options that get vested each period for two different vesting schemes. If cliff vesting is prevalent all of the options which are granted at a particular occasion vest at the same time, say after 4 years of service. Assuming a forfeiture rate of 5% per annum, at the end of the four-year service period $(1 - .05)^4 = 81.5\%$ of the initially granted options are expected to get vested. Thus, .815 times the number of options granted, N, times the fair value of one option, C, gives the total value of the award. Since consideration has to be distributed ratably over the service period, the compensation cost to be recognized during each year has to be calculated on the basis of $.815/4 = 20.4\%$ of the initially granted options. This is the basis for compensation cost of each period. The annual cost would be $.204\, N\, C$. The example is illustrated in figure 1 in the appendix.

With a graded vesting scheme options are vested in certain installments. For example, 25% of the initially granted options get vested at the end of each year. Again, we assume a forfeiture rate of 5% per

annum. Since employees who leave the company after one year of service have already received the first year's installment more options are expected to vest than in the case of cliff vesting. Compensation cost is calculated as if a series of cliff vesting awards was given rather than a single award. The first year's installment has to be fully accrued in this period, and on top of that half of the second year's installment, one third of the third, and so on. Thus, $.25(1+1/2+1/3+1/4) = 47.3\%$ of the options is the basis for cost accrual in the first year. With graded vesting the basis for compensation cost accruals is higher in earlier periods than in later periods. The example is illustrated in figure 2 in the appendix.

Financial year	01	02	03	04	Total
(A) Cliff vesting					
Options vested				81.5%	81.5%
recognized	20.4%	20.4%	20.4%	20.4%	81.5%
(B) Graded vesting					
Options vested	23.8%	22.6%	21.4%	20.4%	88.1%
recognized	47.3%	23.5%	12.2%	5.1%	88.1%

Table 1: Comparison of cliff and graded vesting. For each vesting schedule the percentage of options vested in a given year as well as the percentage of compensation cost recognized is given. We assume that option are granted at the end of year 00 with a service period of 4 years. While in the case of cliff vesting all of the options get vested after 4 years, i.e. at the end of year 04, in the case of graded vesting we assume that in each year of service 25% of the options get vested. Moreover we assume, that each year 5% of the options are forfeited due to usual fluctuation of employees.

Assume that 10,000 options were granted at the end of year 00. In order to calculate the fair value of the award, assume that the strike price was chosen to be equal to the stock price at grant, say \$100. Furthermore, let the expected volatility be 30% p.a., the appropriate interest rate 6%, and the dividend yield 0%. If we assume that all options are exercised as soon as they get vested, we would estimate

that the expected life of the option is 4 years. Using the Black-Scholes model to calculate the fair value of one call we arrive at \$26.38. If we stick to the assumption that all options are exercised as soon as they get vested, the expected life of an option given under the graded vesting scheme is 2.5 years, and the resulting fair value is \$21.09. Note that the assumptions underlying the computation of Black-Scholes values are rather modest. Some of the companies in our study use annual volatilities above 60% or expected lives of 5 years and longer in order to compute pro forma net income.

	Expected life of an option	Accrued compensation cost in year 01	02	03	04	Total cost
(A) Cliff vesting	4.0	53,713	53,713	53,713	53,713	214,852
(B) Graded vesting	4.0	124,681	62,033	32,275	13,428	232,417
	2.5	99,685	49,597	25,804	10,736	185,822

Table 2: Accrued compensation cost of awards (in \$) over the service period under cliff and graded vesting schedules. The example presumes that 10,000 options are granted at the end of financial year 00. In order to calculate Black-Scholes values we assume that the strike price is fixed at the stock price at grant, i.e. \$100. Furthermore, an expected volatility of 30% p.a., an interest rate of 6%, and a dividend yield of 0% is assumed. With an expected life of 4 and 1.51 years the resulting fair value of one option at the grant date is \$26.38 and \$21.09, respectively.

As already mentioned, the NCEO finds that most of the companies that use stock options provide ongoing awards. Therefore, we construct an example to illustrate the hit to earnings with repeated annual grants. Note that we use quite modest assumptions. In particular, we assume that a company grants options in the amount of 1% of already outstanding shares.[13] Say that 1 million shares are outstanding at the end of financial year 00. In order to mimic the stock market behavior of recent years, we let stock prices appreciate annually by 12%. Everything else unchanged, this induces that the Black-Scholes value for newly granted options increases by the same percentage figure making a grant of a fixed number of options each year more and more costly. Compensation cost is distributed ratably over the presumed vesting period of 4 years. Table 3 displays results for a cliff vesting schedule. For the computation of Black-Scholes values the same assumptions are used as in table 2.

[13] Cisco Systems, for example, has got shareholder approval to provide annual grants of up to 4.75% of outstanding shares.

Fin.	Stock	Fair	Options	Accrued compensation cost in financial year									
year	price	value	granted	01	02	03	04	05	06	07	08	09	10
01	100.00	26.38	10.0	53.7	53.7	53.7	53.7						
02	112.00	29.54	10.1		60.6	60.6	60.6	60.6					
03	125.44	33.09	10.2			68.5	68.5	68.5	68.5				
04	140.49	37.06	10.2				77.3	77.3	77.3	77.3			
05	157.35	41.51	10.3					87.2	87.2	87.2	87.2		
06	176.23	46.49	10.4						98.5	98.5	98.5	98.5	
07	197.38	52.07	10.5							111.2	111.2	111.2	111.2
08	221.07	58.31	10.6								125.5	125.5	125.5
09	247.60	65.31	10.7									141.7	141.7
10	277.31	73.15	10.7										160.0
Total compensation cost over all awards:							260.1	293.6	331.5	374.2	422.4	476.9	538.4

Table 3: Accrued compensation cost with revolving options awards under a cliff vesting schedule.

4 The quality of reported earnings

In order to investigate whether stock option compensation cost is negligible we analyze income statements of 20 S&P 500 companies. These companies are selected on the basis of a recent UBS-Warburg study[14] which investigates the intrinsic value of currently outstanding options of all S&P 500 companies. We restrict our analysis to the 20 companies which have the highest ratio of total outstanding options to total outstanding shares. Rather than looking at the intrinsic value of options we analyze compensation cost disclosures in the most recently

[14] See Carson (2000)

available 10-K forms filed with the SEC. Interestingly, none of the 20 companies in our study follows FAS 123.

Table 4 displays a company's net income as stated, i.e. accounting for stock-based compensation according to APB 25, as well as pro forma income complient with FAS 123. Let us have a closer look at Yahoo. The total Black-Scholes value of all options granted during financial year 1999 was $1,563 million (last column). If all the company's stock option plans would follow the same vesting schedule, say cliff vesting with a service period of 4 years, then compensation cost of $390 million should have been recognized. Unfortunately, the company has implemented different vesting schedules and it does not disclose how many options are granted under each schedule. Therefore, it is not possible for an investor to verify the income reduction from the disclosures made in the 10-K form. Note that the 1999 difference of pro forma income and income as stated ($317 million including tax effects) is largely due to options grants given in 1999. The total Black-Scholes value of stock option granted in financial years 1999, 1998, and 1997 amounts to million $1,563, $643 and $89, respectively.

Company Name	Ratio of total outst. options to shares	Net income as stated (mill. $)	Pro forma net income (mill. $)	Reduction of stated net income	Options granted in FY 1999		
					No. of options (mill.)	Black Scholes value ($)	Value of total award (mill. $)
Siebel Systems	45%	122	95	22%	27	20.86	553
Young & Rubicam	34%	167	159	5%	4	12.30	54
Delta Air Lines	33%	1,101	935	15%	20	16.00	314
Maxim Integrated	30%	196	158	19%	8	19.21	149
Broadcom	28%	83	-106	227%	23	31.35	722
Cendant	25%	-55	-213	287%	30	18.10	543
Merrill Lynch	24%	2,618	2,326	11%	30	24.78	742
Yahoo	23%	61	-256	519%	37	41.77	1,563
Citrix Systems	23%	117	64	45%	21	14.37	304
Sapient	22%	30	-10	132%	4	21.62	97
Paine Webber Group	21%	629	593	6%	4	13.64	49
PeopleSoft	20%	-178	-263	48%	30	6.61	196
T.R. Price	20%	239	219	8%	3	9.86	34
Qualcomm Inc.	19%	201	149	26%	5	28.56	135
Capital One Fin.	19%	363	326	10%	11	25.92	273
Lehman Bros.	18%	1,132	1,091	4%	11	13.98	148
America Online	18%	762	504	34%	55	22.93	1,256
Hasbro Inc.	18%	189	171	10%	7	12.13	87
Toys 'R' Us	18%	279	232	17%	40	6.26	249
J.P. Morgan	17%	2,055	1,962	5%	6	37.70	239

Table 4: Cost of stock-based compensation of 20 S&P 500 companies that rely heavily on stock option plans. The first column displays the ratio of total outstanding shares to total outstanding options, including non-vested options. Then, net income as stated and pro forma income complient with FAS 123 are given, followed by the reduction of net income if companies would have applied the fair value method of FAS 123. The last three columns exhibit stock options granted in financial year 1999: number of options granted, weighted average Black-Scholes value of one option, and Black-Scholes value of the total award.

The mean reduction in net income for all 20 companies computes to a stunning value of 67.8 %, the median is 18.1 %. A net income reduction below 5% is recorded only by three companies, Lehman Bros. (3.6%), J.P. Morgan (4.5%), and Young & Rubicam (4.97%). All other companies exceed the usual immateriality limit. While the next 9 companies would experience an earnings hit between 5 and 25%, the remaining 8 companies would experience a reduction of net income by more than 25% if they would apply FAS 123. Two companies, i.e. Broadcom and Yahoo, should have reported a net loss rather than a net income. Looking at how much value is handed over to employees by companies like Yahoo, Cendant, or Broadcom it is hard to conclude that these amounts are not economically significant.

5 Conclusion

It should be noted that the first press releases which capture the attention of investors and analysts do provide considerably less detail than the 10-K forms filed with the SEC. It is rather unusual that a company includes the number of granted options or a pro forma net income according to FAS 123 into its press release. This is particularly irritating since after the initial press release investors may have to wait

a month or two for the SEC filing of the 10-K form.

For individual investors it is tedious to obtain pro forma incomes, especially in the light that they would have to estimate quarterly pro forma net income by themselves. However, institutional investors relying on I/B/E/S earnings forecasts are not better off since I/B/E/S does not provide forecasts of pro forma income.

Since the cost of these stock option programs can reach economically significant amounts it is stunning that the financial press is so silent about these figures while forecasts of "earnings as stated" and related components get so much attention. If investors are able to make perfect forecasts of the earnings reduction induced by stock option plans then indeed this should be no subject at all. However, given the fact that we often observe earnings surprises, i.e. forecasts of regular earnings are often out of line with actually announced figures, it seems at least doubtful that forecasts of net income reduction are more precise. Thus, the question remains why do analysts focus on net income as stated and not pro forma income. Why do we hear so little about the hit to earnings? Are investors fully aware of this effect?

References

Callies, C. A., and P. Sareen (2000): "Stock Options Creating Wealth for the Lucky Few," *in: Equity Research, February 7, 2000, Credit Swiss First Boston.*

Carson, J. (2000): "US Economic Perspectives - Stock Option Study of S&P 500 Companies," *in: Global Economic and Strategic Research, July 14, 2000, UBS Warburg.*

I/B/E/S (1999): *The I/B/E/S Glossary, A Guide to Understanding I/B/E/S Terms and Conventions.* I/B/E/S International Inc.

Johnson, S. A., and Y. S. Tian (2000): "The value and incentive effects of nontraditional executive stock option plans," *Journal of Financial Economics*, 57, 3–34.

Liang, J. N., and S. A. Sharpe (1999): "Share Repurchases and Employees Stock Options and their Implications for S&P 500 Share Retirements and Expected Returns," Discussion Paper 59, Federal Reserve Board, Staff Studies.

Murphy, K. J. (1996): "Reporting Choice and the 1992 Proxy Disclosure Rules," *Journal of Accounting, Auditing and Finance*, 11, 497–515.

NCEO (1999): *Current Practices in Stock Option Plan Design, revised and expanded edition.* National Center for Employee Owernership, Oakland, CA.

Paulin, G. (1992): "Resurgence of stock option popularity. Rethinking Corporate Compensation Plans," *Conference Board Report no. 1015*, pp. 19–21.

Yermack, D. (1998): "Companies' Modest Claims about the Value of CEO Stock Option Awards," *Review of Quantitative Finance and Accounting*, 10, 207–26.