EQUITY-BASED INCENTIVES: WEALTH TRANSFERS, DISRUPTION COSTS AND NEW MODELS

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Abstract

This article seeks to: a) introduce new models of incentives, including those that completely solve the problems of "Back-dating" and "Re-pricing" of employee stock options and equity-based incentives; b) introduce new theories of unwarranted wealth-transfers and Disruption Costs inherent in the use of Equity-based Incentives ("EBIs"). Several recent detailed studies found that there is widespread ESO/EBI-related fraud and non-compliance, which could have damaging effects on public confidence in financial systems and increase market volatility.

Keywords: Employee Stock Options; Equity-Based Incentives, Willingness-To-Comply; Complexity; Corporate Governance

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I. Introduction

The term "EBI" refers to all non-Common-Stock equity-based incentives, and include Contingent Rights, Warrants (to purchase equity), equity-linked incentives, Employee-Stock-Options ("ESOs"), etc.. EBIs sometimes create unjustified wealth transfers to the EBI-holder or to shareholders (or to investors in other companies in the same industry), which in turn creates substantial disruption costs at the company level and the industry level.

In the US, there has been recent significant criminal investigations and civil lawsuits pertaining to "back-dating", "forward-dating", "spring-loading" and "repricing" of EBIs/ESOs by various companies, which typically results in unwarranted wealth transfers – the US SEC, US Attorneys and state Attorney Generals have particularly been active in these issues.[12], [13] Many companies (such as Brocade

[12] See: 1) Liedtke M (July 4, 2006), Silicon Valley Suffers Stock Option Fallout, Associated Press; 2) Rosen C (July 2006), Stock Option Backdating And Other Grant Timing Controversies, NCEO, USA; 3) Lie E & Heron R (July 2006), "What Fraction of Options Grants to Top Executives Have Been Backdated or Manipulated?" (See: http://www.biz.uiowa.edu/faculty/elie/Grants%207-14-2006.pdf); 4) Associated Press (June 12, 2006), Monster Investigates Possible Backdating Of Stock Option Grants. Northwestern Florida Daily News; 5) Dates From Hell: The Scandal Over Backdated Share Options Goes From Bad To Worse", July 26, 2006, The Economist; 6) Shaw H (July 12, 2006), Sycamore Suit Cites CFO backdating Role, www.cfo.com ; 7) Sellers D (July 18, 2006). US Attorney Investigating Alleged Stock options Fraud. www. Macsimumnews.com; 8) Morgenson G (July 30, 2006), How backdating Hurts Stockholders, International Herald Tribune (Florida); 9) Dash E (July 2006), IRS Reviewing Companies In Options Inquiries, Herald Tribune (Southwest Florida, USA); 10) Langberg M (July 20, 2006), Enforce Laws On Options; New Rules Un-Needed: Scandal Imperils Valley's Foundation, www.Heraldtoday.com; 11) Rivlin G & Dash E (July 23, 2006), Silicon Valley Blight Returns, International Herald Tribune; 12) Johnson C (July 21, 2006), Pair Charged In Stock Probe, www.honoluluadvertiser.com; 13) Gordon M (July 26, 2006), SEC Moving To Require Disclosur Of More Details Of Executive Pay, Options, Associated Press; 14) Petruno T & Menn J (July 21, 2006), US Charges Two In Stock Options Case, www.latimes.com; 15) Gordon M (June 2, 2006), Backdating Of Stock Options Is Worrisome, www.ibtimes.com; 16) Lashinsky A (July 26, 2006), Why Options Backdating Is A Big Deal, July 26, 2006, (http://money.cnn.com/2006/07/26/magazines/fortune/lashinsky.fortune/index.htm); 17) Cantrell A (July 19, 2006), Many Firms Seen Dodging The Back-Dating Bullet (http://money.cnn.com/2006/07/14/technology/options_study/index.htm); 18) Cantrell A (____), More Than 100 Firms Probably Back-dated Options (http://money.cnn.com/2006/07/12/technology/options_saga/index.htm); 19) White J (June 2007). *Testimony Concerning Tax and Accounting Issues Related to Employee Stock Option Compensation*. Before the U.S. Senate Permanent Subcommittee on Investigations June 5, 2007.

[13] See: Norris F (July 24, 2006), Executive Riches, Corporate Losses, International herald Tribune (http://www.iht.com/articles/2006/07/24/business/place.php); See: Sammer J, "Is The Price Right ? (http://www.businessfinancemag.com/magazine/archives/article.html?articleID=13770); See: Munarriz R (July 13, 2006), Dueling Fools: Stock Options Bear, (http://www.fool.com/news/commentary/2006/commentary06071310.htm); See: "Take-Two Sued By Shareholder Over Stock Options", July 26, 2006 (http://www.gamasutra.com/php-bin/news_index.php?story=10223); See: Watson Wyatt Worldwide (Feb. 2003), Underwater Stock Options?: Some Lifelines (http://www.watsonwyatt.com/asia-pacific/pubs/execcomp/articles/feb03/2003_02_01.asp); See: "Sec Investigates Activision Over Stock Options", July 31, 2006 (http://www.gamasutra.com/php-bin/news_index.php?story=10289);See: http://www.nceo.org/surveys/; http://www.nysscpa.org/cpajournal/2007/1007/infocus/p18.htm; www.corpgovcenter.org/Research2006/__InadEhr2005.pdf; http://www.publicforuminstitute.org/nde/sources/reports/2000-stock-options.pdf; http://www.bea.gov/papers/pdf/empstop.pdf;

Communications, **Intuit** (Nasdaq: INTU), **CNET Networks** (Nasdaq: CNET), **Openwave** (Nasdaq: OPWV), **Biomet** (BMET), **Caremark** (CMX), **UnitedHealth Group** (UNH), and **Zimmer** (ZMH), may have to restate their financial statements). For a list of more than one hundred and thirty-five US companies that are, or were being investigated or prosecuted by US federal and or state agencies, and the status of the investigations see: http://online.wsj.com/public/resources/documents/info-optionsscore06-full.html. For a list of corporate executives that either resigned or were convicted as a result of EBI/ESO investigations/prosecution, see: http://online.wsj.com/public/resources/documents/info-optionsscore06-exec.html.

A 2005 analysis of 1,000 US companies by M.P. Narayanan and H. Nejat Seyhun of the University of Michigan for the *Wall Street Journal* found that their that ESO-granting practices in the US between 2002 and 2004 often failed to comply with Sarbanes-Oxley Act requirements.

A July 2006 report by Eric Lie and Randall Heron (University Of Iowa, USA) found that: a) 29.2% of US companies that issued ESOs to executives and/or directors during 1996-2002 had grant-date patterns that could be deemed as conclusive evidence of backdating and or other manipulative practices (such as "spring-loading," the announcement of a grant of EBIs/ESOs before public announcement of good news), and b) 23% of ESOs issued to executives appear to have been backdated or spring-loaded. ESO backdating was more prevalent in technology companies, smaller companies, companies granting ESOS to more executives and directors, and companies with higher stock price volatility (29% of companies with high volatility appear to have manipulated grant dates, compared to 13% of those with low volatility). According to the study, the Sarbanes Oxley Act has helped in reducing misconduct associated with EBIs/ESOs. Only 7.7% of companies filing within the new two-day reporting window for options grants show a pattern of backdating, compared to 19.9% of companies that did not meet the requirements. The study focused on the 51% of the grants during the period that were unscheduled and at-the-money.

II. Existing Literature
1. ESO/EBIs

The existing literature on share-repurchase programs, changes of stock dividends and ESOs/EBIs, is extensive, and include: Baynes (2002); Hall & Murphy (2003); Baynes (2002); Langevort (2004); Krawiec (2003); Cunningham (2004); Darley (2005); Posner (1996); Heath, Huddart & Lang (1999); Aboody & Kasznik (2000); Hall & Murphy (2000); Ellis (1998); Bettis, Bizjak & Lemmon (1999). Jun, Jung & Walkling (Nov. 2005); Nwogugu (2003; 2004; 2005); Hall (2004); Dittman & Maug (2006); Hall & Knox (2004); Durnev & Kim (2005); Liu (2005); Cyree (2005); Windsperger & Jell (2005); Lee (2005); Kirstein & Will (2003); Bebchuk & Fried (2003); Burguet, Caminal & Matutes (2000); Buyinski & Harsen (2002); Centola, Willer & Macy (2005); Darley (2005); Davydov & Lintesky (July 2002); Durnev & Kim (2005); Ellis (1998); Kahle (2005); Langevoort (2002); Laufer (1999); Liu (2005); Trafimow (2003). However, no article has introduced EBIs/ESOs that solve "repricing", "re-loading" and "back-dating" of ESOs/EBIs.

It has been empirically shown that : **1)** EBIs/ESOs and related information and risk phenomena have direct effects on stock market volatility, trading volume, hedging activities, and capital transfers; 2) EBIs/ESOs affect investor expectations of prospective government monetary policies and fiscal policies; 3) EBIs/ESOs affect the relationship between shareholders and management – hence, largely determine the magnitude and effect of

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http://www.cato.org/research/articles/reynolds-020718.html; http://www.pbs.org/newshour/bb/business/july-dec06/stockoptions_09-27.html; http://www.signonsandiego.com/news/business/20070505-9999-1b5options.html;http://www.schiffhardin.com/binary/corp_sec_081806.pdf; http://www.northcountrygazette.org/news/2007/10/09/safenet_fraud/; http://www.sec.gov/news/testimony/2007/ts060507jww.htm; http://www. law.com/jsp/ihc/PubArticleIHC.jsp?id=1158051922878; http://subscript.bna.com/SAMPLES/wcr.nsf/Highlights/Highlights?OpenDocument; http://subscript.bna.com/SAMPLES/wcr.nsf/38b150e5c7cd236385256b5700608ba6/353172312f502ddc852572ad00710dfb?OpenDocument; See: *United States v. Stockman*, S.D.N.Y., No. 1:07-cr-00220-BSJ-1, 3/26/07 (US District Court For The Southern District Of New York); See: "07/17/2007 Fact Sheet" from the President's Corporate Fraud Task Force In The US Department Of Justice - http://www.usdoj.gov/opa/pr/2007/July/07_odag_507.html; See: US Federal Bureau of Investigation (2006), *Financial Crimes Report To the Public For Fiscal year 2006* - http://www.fbi.gov/publications/financial/fcs_report2006/financial_crime_2006.htm; http://www. computerbusinessreview.com/article_news.asp?guid=952584B3-0205-4C01-8A6D-CABA404395F7; http://www.cfo.com/article.cfm/______9563406______?f=related; http://www.nytimes.com/2006/08/31/business/31options.html?_r=1&n=Top/Reference/Times%20Topics/ Subjects/S/Stock%20Options%20and%20Purchase%20Plans&oref=slogin; http://topics.nytimes.com/top/reference/timestopics/subjects/ s/stock_options_and_ purchase_plans/index.html?offset=40&s=closest&query=FRAUDS+AND+SWINDLING&field=des&match=exact; http://www.internetnews. com/bus-news/article.php/3621681; http://www.nytimes.com/2006/06/19/business/businessspecial/19options.html; http://opencrs.cdt.org/__rpts/RL33926_20070315.pdf; http://www.mofo.com/news/updates/files/update02185.html; http://commdocs. house.gov/committees/bank/ hba90627.000/hba90627_0.HTM; http://management.silicon.com/government/0,39024677,39160580,00.htm; http://online.wsj.com/public/resources/documents/info-optionsscore06-full.html; http://www.iht.com/articles/2006/06/19/business/options. php;http://www.internetnews.com/bus-news/article.php/3637301; http://www.mwe.com/index.cfm/fuseaction/publications.nldetail/object__________id/39d435f7-d2b4-492f-8b48-235d3751e229.cfm; http://www.fbi.gov/publications/financial/fcs_report2006/financial_crime_2006.htm;

agency problems, adverse selection problems and moral hazard problems in companies, all of which affect overall corporate performance in the economy. Aboody & Kasznik (2000); Ali & Stapledon (2000); Aryal & Sun (2004); Bakshi, Cao & Chen (2000); Bebchuk & Jolls (1999); Bettis, Bizjak & Lemmon (2005); Brierley (2001); Burchett & Willoughby (2004); Carter & Lynch (2001); Chance, Kumar & Todd (2000); De Geest, Blegers & Vandenberghe (2001); Fehr & Falk (2002); Hall (2004); Hall & Murphy (2003); Heath, Huddart & Lang (1999); Jun, Jung & Walkling (Nov. 2005); Kahle (2005); Kraus & Smith (1996); Nam, Ottoo & Thornton (2003); Rhoades-Catanach (2004); Rogers (2005); Thelen (2005). Perfect, Wiles & Howton (2000).

The usefulness of EBIs/ESOs is somewhat limited by difficulties in pricing/valuation and incentive design. Other areas for future research include: a) ways to further reduce moral hazard, agency and compensation-accuracy problems implicit in incentive contracts, and b) designing incentive systems for supply chains and for the retailing, and travel industries.

2. Market Mechanisms, And Mechanism Design Theories

Traditional ESOs/EBIs are market mechanisms, and together the associated legal law and economic problems that they create, are evidence that existing Mechanism Design Theory is inaccurate and impractical. The literature on Mechanism Design Theory [14] has some major gaps and inaccuracies, some of which are explained as follows:

1. Errornously assumes that all agents truthfully disclose their preferences; and that all agents disclose their preferences at the same rate and at the same time.

2. Does not account for the value accruing to the agent or principal or participant, by withholding information about their preferences.

3. Errornously assumes that the mechanism is fair and un-biased. In reality, even completely automated mechanisms have biases. Most mechanisms involve some human intervention and or human processes, and existing Mechanism Design Theory does not account for human biases, and processes such as altruism, regret, aspirations, etc., both in the participants and in the humans involved as part of the mechanism.

[14] **See**: Myerson R (2002). Optimal Coordination Mechanisms In Generalized Principal Agent Problems. *Journal Of Mathematical Economics*, 10(1):67-81.
See: Myerson R (1983). Mechanism Design By An Informed Principal. *Econometrica*, 51(6):1767-1797.
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See: Feigenbaum ___, Papadimitriou S & Shenker __ (________). A BGP-based Mechanism for Lowest-Cost Routing.
See: Parkes D & Schneidman J (______). *Distributed Implementation of Vickrey-Clarke-Cloves Mechanisms*.
See: Gibbens ___ & Kelly ___ (_______). *Resource Pricing and the Evolution of Congestion Control*.
See: Nisan N (________). *Algorithms for Selfish Agents -- Mechanism Design for Distributed Computation*. Working Paper.
See: Lehmann et al. (Sept. 2002). Truth Revelation in Approximately Efficient Combinatorial Auctions. *Journal Of The ACM*, 49(5): 577-602.
See: Gordon B (______). *New Trade-offs In Cost-Sharing Mechanisms*.
See: Sabzposh A (_______). *Routing Without Regret: On Convergence To Nash Equilibria Of Regret Minimizing Algorithms in Routing Games.*
See: Hurwicz L & Marschak T (1985). Discrete Allocation mechanisms: Dimensional Requirements For Resource Allocation mechanisms When Desired outcomes Are Un-Bounded. *Journal of Complexity*, ______________.
See: Maskin E & Laffont J J (1979). *A Differential Approach To Expected utility maximizing Mechanisms*. In J J Laffont, ed., Aggregation And Revelation Of Preferences, North Holland, pp. 289-308.
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See: Maskin E (2004). The Unity of Auction Theory. *Journal of Economic Lite*rature, 42(4):1102-1115.

4. Does not account for varying levels of "privateness" of agents' information – rather, erroneously assumes binary situation in which information is either public or private.

5. Mechanism Design Theory does not incorporate the effects of regulation on agents and on the mechanism; and does not account for constitutionality of mechanisms.

6. Errorneously assumes that all agents are "rational" and self-interested. There can be many reasons for agents' irrationality and propensity to act for the benefit of the society. Erroenously assumes some minimum level of uniformity of agents' preferences. Agents' preferences vary widely.

7. Does not account for differences in agent's information processing capabilities.

8. Erroenously assumes that mechanism is monolithic in time, space and expense – in reality some mechanisms are dispersed in space (various locations) and time (requires participation and various disclosures at various times) and expenses (cost of participation varies).

9. Errornously assumes that monitoring costs, compliance costs, switching costs, access costs, decision costs (costs of contemplating a decision) and sanctions (for non-compliance with the mechanism) are minimal or non-existent. In reality, these types of costs are both monetary/physical and non-monetary/psychological and have significant effects on the efficiency of mechanisms.

10. Errorneously assumes that agents have quasi linear utility functions and are risk-neutral. In reality, agents' attitudes towards risk vary dramatically and depend on many factors. Furthermore, agents' utility functions are more likely to be non-linear because: a) the agent will react to the mechanism (economically, psychologically and socially), and react to the prospect of other participants, and also react to perceived opportunity costs, in addition to his/her normal utility function.

11. Errorneously assumes that the social choice functions inherent in mechanism designs have linear "Benefit Effects"; where a Benefit Effect is the economic gain or loss of social welfare across all agents and across the society/economy, as the mechanism functions during a specified time interval. Hence, "Benefit Effect" is defined with respect to time and to the entire economy. Benefit Effects are likely to be non-linear because: a) agents vary in terms of wealth, utility functions, risk aversion, time horizon, preferences, etc., b) the economy is not static, and changes in various elements of the economy are not discrete, c) not all eligible agents or permitted agents or financially capable agents will participate in the mechanism.

12. Errorneously assumes that the social choice functions inherent in mechanism designs have uniform and same "Impact Effects" across all agents; where an Impact Effect is the magnitude of the monetary and non-monetary impact of the mechanism on all agents. Erroenously assumes that all social choice functions inherent in mechanisms have linear effects on agents' utilities and participation strategies

13. Errorneously assumes that all eligible, financially capable and permitted agents will participate in the mechanism, and will participate at the same time.

14. Erroenously defines the success of mechanisms primarily in terms of utility. This approach does not sufficiently incorporate other elements and result of mechanisms – psychological gains/losses, emotions, social capital, reputation effects, etc.. Futhermore, utility as used in Mechanism Design Theory is relatively static. McCauley (2002)[15] states that there are several problems in the use of utility. Most Mechanism Design Theories are based on equilibrium as a relevant 'state' and as an objective; and the concept of equilibrium is "static". In reality true equilibrium does not exist, and cannot be achieved in mechanisms due to: a) continous changes in agents' preferences, wealth, access to information, etc., b) transaction costs and opportunity costs, c) mental states of agents, d) time constraints, e) government regulations and or industry stanbards/practices, f) agents' varying reactions to incentives over time.

15. Mechanisms are defined and designed only in terms of agents' preferences, public actions, and private actions. This approach does not incorporate the effects of agents' reactions to incentives, and values of hidden information to agents, and agents' information processing capabilities, the mechanism's information processing capabilities, regulation and government enforcement.

16. Contrary to Mechanism Design Theory, the set of all possible preferences of agents is not finite. Within this context of mechanisms and group action, the definition of 'finite" should be based on achievability, and not on mathematical ranges.

17. Errornously assumes that each agent's and all agents' preferences are static over time; and mechanisms are preference formation-independent (ie. the mechanism does not affect the agents' processes of forming their preferences). In reality, most mechanisms are interactive, and the agent's preferences change over time as he/she interacts with both the mechanism and other agent-participants and non-participants.

18. Errornously assumes that the mechanism is removed from, and distinct from the agents – in reality, the agents typically form a major part of the mechanism (as in auctions, online file sharing networks, multiple listing systems, etc.).

19. Errorneously assumes that the mechanism's main role is either allocation and or coordination. In reality many mechanisms serve other economic and non-economic purposes (some of which are un-intended) such as: a) psychological reassurance (voting, auctions, etc.), b) information dissemination, c) comparison – which increases social welfare my reducing overall agents' search costs, d) entertainment.

20. Erronously assumes that mechanisms can be deliberation-proof (in equilibrium, all agents don't have any incentive to strategically deliberate). In most existing mechanisms, agents deliberate while using the mechanism.

IV. EBIs/ESOs And Associated Information Effects And Risk Effects Have Significant Macroeconomic Implications

The Information-Content and absolute monetary values of EBI/ESO grants, EBI/ESO repricings, EBI/ESO values and EBI/ESO exercises have become critical macroeconomic variables. See: Moylan (2000); Nwogugu (2005b); Kwon & Shin (1999). The reasons are as follows.

[15] See: McCauley J (2002). Adam Smith's Invisible Hand Is Unstable: Physics And Dynamics Reasoning Applied To Economic Theorizing. Physica A Statistical Mechanics And Its Applictaions, 314(1-4):722-727.

The magnitude and timing of overall wealth transfers (justified or unjustified) in the economy that are inherent in EBIs/ESOs, represent significant movements of economic capital and social capital in the economy, and significant portions of overall 'output' (measured in the traditional sense). The growth of, and rate of innovation in many key industries in many modern economies, has been directly and empirically attributed to the use of EBIs/ESOs.

In many countries, government fiscal policy processes are increasingly recognizing and incorporating the macroeconomic effects of EBI – as manifested by (somewhat limited) inclusion of EBIs in national accounts and macroeconomic aggregates [See: Moylan (2000)], and changes in corporate tax rates (capital gains and income tax) and individual tax rates (capital gains and income taxes) that are applicable to EBIs. Government monetary policy processes in most countries have also been directly and indirectly incorporating the effects of EBIs – as reflected in: a) changes in disclosure requirements which are designed to reduce volatility and enhance transparency in capital markets, and b) central bank purchases/sales of government bonds in response to volatility in stock markets, and c) central bank rate setting in response to overall corporate profits.

EBI-related phenomena affect/determine the true impact of regulations/laws that govern businesses – in the US, some laws that govern business conduct don't seem to be able to handle the impact of EBIs/ESOs, and hence, existing incentive systems effectively determine the levels of compliance, deterrence effects of regulations/laws, and economic costs of regulations/laws, all of which affect (and can determine) the level and output of overall economic activity.

In most industries, EBIs/ESOs are most prevalent among executives (rather than non-executive employees), and EBIs account for a substantial portion of executives' wealth – these executives are often the final decision makers on issues that have profound effects on traditional macroeconomic variables such as hours worked, corporate profits, total output, existing industrial capacity, corporate taxes, capital spending by companies, volume of securities issued/retired, volume of bankruptcies/recapitalizations, etc..

EBIs/ESOs create several multiplier effects in the economy because: 1) EBI/ESO-grantees are typically heads of households, 2) EBI/ESO grantees sometimes rely on EBI/ESO gains for retirement, 3) other family members often rely on, or expect EBI/ESO gains/losses; 4) companies save large amounts of cash by issuing EBIs/ESOs; 5) the incentive effects of EBIs/ESOs sometimes spread to the company's suppliers and customers who view EBI/ESO-plans as key to quality, efficiency, good customer service, stability and profitability in the company.

To the extent EBIs/ESOs have a motivating effect, they create human capital and sometimes social capital, and hence create valid macroeconomic output. Nwogugu (2005b). The structure of the US and the world economies have changed substantially during the last twenty years. Intangible assets account for at least 60% of assets of US companies. Since human capital and social capital are so much more relevant in modern economies (both as economic inputs and outputs), EBIs are valid components of national accounts/macro aggregates. However, EBIs have been included in macro aggregates in a rather limited manner – typically by using only the differences between the market price and the strike price. However, this is not an accurate measure of the true effects of EBIs/ESOs.

The difficulties in valuing EBIs/ESOs obfuscates the determination of the extent of wealth transfer. The process of awarding and valuing EBIs/ESOs are sometimes arbitrary. Typically, there are different decision processes for awarding EBIs/ESOs to executives and employees. EBIs/ESOs awarded to entities in exchange for services typically have more favorable terms than EBIs/ESOs awarded to employees. Wealth transfer via EBIs is more significant in non-dividend paying companies, because EBI returns are typically unlimited. The issue of unjustified wealth transfer by EBIs is crucial in corporate governance, because employees' EBI gains often exceed the effort they contribute, and the fact that such EBI gains can occur without the firm having earned any returns or created any value for for shareholders. Thus, the crux of incentives is matching compensation to employee efforts. Trimarchi (2003).

V. "Repricing", "Re-Loading" And "Back-Dating"

1. Repricing Of ESOs/EBIs

Under US regulations/laws, ESO/EBI Repricing is a much bigger problem than other forms of wealth transfer using ESOs/EBIs (ie. back-dating, forward-dating, etc.), because: **a)** repricing is legal, and can transfer more wealth than other methods, **b)** repricing can also reduce the company's tax burden; **c)** Repricing can be used with timing of announcements to cause greater un-justified wealth transfers. See: WatsonWyatt Worldwide (2003); Rogers (Spring 2005); Sesil, Blasi, Kruse & Kroumova (2002); Yermack (2001); Jun, Jung & Walkling (Nov. 2005). The main reasons why Boards Of Directors and management typically act (re-price and or 'backdate' ESOs) when ESOs are "underwater" are as follows:

- ESOs/EBIs then become ineffective incentives; and may even de-moralize employees.
- ESOs/EBIs become below-market compensation;
- Employee switching costs are generally low when the company's stock price is declining, but varies drastically across different heirachies in the organizational strcuture- employees can go and work for a competitor and get an equivalent value of their ESOs "re-priced" and issued by this competitor.

- Underwater ESOs/EBIs exercerbates principal-agent problems and moral hazard problems.
- Underwater ESOs diminishes the perception of ESOs as a long-term incentive, changes the role of ESOs in compensation strategy and maybe perceived as an indication of management's lack of confidence in near-term prospects for stock-price recovery.
- Management has to consider the relative importance of human capital to the company's business; and the talent/marketability of employees. Labor switching costs maybe low.
- The duration and magnitude of the stock-price decline may become de-motivating factors; whether or not the price decline is attributable to poor performance or market conditions

Although re-pricing reduces the need for issuance of more options/warrants, controls ESO/EBI "overhang" and increases employee motivation/retention, under current US accounting regulations, re-pricing is costly. Under FASB Interpretation # 44 ("FIN44"), direct or indirect ESO/EBI re-pricings result in charges to earnings, both of which must be done using a new measurement date and variable accounting from the date of the modification (issuance of new ESO with lower Strike Price than the original strike price) until the ESO expires, is exercised, or is forfeited unexercised.

An indirect ESO/EBI re-pricing occurs if: a) the overall Strike Price (all consideration) for the new ESO is or maybe lower than that of the cancelled ESO, even if the stated Strike Price remains the same, or b) the optionee is not subject to stock market risk for at least six months; or c) the ESO terms are modified in order to decrease the likelihood the optionee will exercise the ESO (e.g., reduced ESO term). The ESO/EBI Strike Price is deemed to be reduced if: a) there is simultaneous award of a new ESO at a lower Strike Price, and a cancellation of another ESO; or b) there is a simultaneous award of a new ESO at a lower Strike Price and a cash settlement of an outstanding ESO, or c) the new ESO is granted within the six month period before or after the cancellation or settlement of another ESO issued by the same entity.

US Financial Accounting Standards Board (FASB) FIN44 permits companies to cancel an 'underwater' ESOs, and then issue a new ESO without being subject to disadvantageous accounting rules, only if: a) six months has elapsed after the ESO cancellation, and b) the cancellation was voluntary by the employee, and c) it is permissible to express the company's intent to issue a new ESO later in connection with a voluntary cancellation, provided there is no binding commitment as to the new/proposed ESO's Strike Price or the number of shares for which the new/proposed ESO is exercisable; and c) there is no agreement (oral, written, or implied) to compensate the ESO-holder for any increase in the stock price after an ESO cancellation or settlement but before the issuance of the new ESO.

In most cases, the "exchange" in ESO/EBI re-pricings is less than a 1:1 ratio – i.e 3:1 (33% replacement); 4:1 (25% replacement); 3:2 (66% replacement) – and the company can use various exchange tiers, if the cancelled ESOs have a wide range of Strike Prices. The ESO-exchange typically increases the number of encumbered' shares (the new ESOs have a higher likelihood of being in-the-money), but does not change the overhang level. Some companies offer a cash settlement for cancelled ESOs in repricings, but this creates valuation problems in addition to a compensation expense to the company. Under FASB rules, a voluntary cancellation of underwater ESOs that is simultaneous with a new grant of restricted stock will not create a compensation expense for cancelled ESOs, there will be a fixed accounting treatment for restricted stock and the six month look-back/look-forward period applicable to an ESO replacement, will not apply.

2. Alternatives To Re-Pricing And Backdating Of ESOs/EBIs

The typical alternatives to re-pricing and back-dating "underwater" ESOs/EBIs include:

- Special out-of-cycle grants of ESOs/EBIs - the advantages include 1) No compensation expense (if granted at Fair Market Value), 2) Increases dilution, 3) requires sufficient number of available shares;
- Issue the next annual ESO/EBIs grant much earlier than scheduled; (comply with six months plus one day rule).
- Issue re-load stock options. See: Dybvig & Loewenstein (2003).
- **I**mplement a new long-term incentive award such as performance shares or units, restricted stock, or performance cash - the advantages include: 1) full value awards moderate riskier stock options, 2) increases employee retention, 3) creates compensation expense. See Table One.
- Issue restricted stock in exchange for underwater ESOs/EBIs.
- Pay cash to employees in exchange for the underwater ESOs/EBIs.
- Grant additional shares to employees.

3. "Re-Load" ESOs/EBIs

Re-load ESOs/EBIs have become very popular components of employee compensation packages. See: Dybvig & Loewenstein (2003). Reload ESOs/EBIs have become a major form of unwarranted and perhaps illegal wealth transfer from shareholders to employees/managers, primarily because:

- Reload ESOs/EBIs cannot be valued accurately – all pricing models are based on erronuous assumptions that the stock prices follows some stochastic process or processes.
- Reload ESOs/EBIs typically don't require any vesting period or require only relatively short vesting periods (typically six months or less).

- Typical awards of Reload ESOs/EBis typically don't require achievement of any performance targets as part of vesting requirements.
- The multiple re-load feature of these ESOs/EBIs constitutes: a) a substantial increase in uncertainty about equity values, b) increase in volatility of the company's equity, c) unfair wealth transfer.
- Reload ESOs/EBIs tend to increase managerial risk taking.
- Reload ESOs/EBIs reduce incentive for manager to pay dividends. The prospect of increased equity dilution causes managers to reduce dividends where Reload ESOs/EBIs have been issued – the much greater number of shares (if reload ESOs/EBIs are exercised) will reduce the absolute magnitude and hence, information content/effect of any cash dividends. Managers have more incentives to re-invest cash in riskier projects in order to increase expectations values of the company's equity.
- The consideration that is received upon exercise of the Reload ESOs/EBIs: a) is unlimited, b) does not adjust to changing market conditions (ie. declining stock prices, and or sudden increases in volatility of the stock price); c) is often much greater than what the ESO-holder would get by exrcising a traditional ESO.

Some of the disadvantages of ESOs/EBIs are discussed in Nwogugu (2004).

Table 1. Common Approaches For "Underwater" ESOs/EBIs

Approach	Summary Description	Advantages	Disadvantages	Other Comments
"Wait & See"	• Business as usual • Continue regular stock option practices	• Simple • Shareholder alignment • Avoids additional underwater options if stock price declines further	• Employee perception • Possible turnover	• Attractive if limited number of shares available for future grants
"Grant More"	• Make special off-cycle grant (or accelerate timing of normal awards)	• Relatively simple • Reinstate incentive and retention • No accounting expense	• Increased dilution • Stock price may decline further	• Used by Microsoft and Cisco • New options may have different provisions (e.g. shorter term)
"6 & 1"	• Cancel underwater options and grant new options more than 6 months and 1 day later • Exchange rate usually less than 1:1	• Lowers dilution (due to a less than 1:1 exchange) • Avoids accounting expense	• Risk of price rebound during six-month waiting period • Negative shareholder reaction possible • Potential employee turnover during waiting period	• Exchange rate based on equivalent economic value • Proxy re-pricing table may be required • Used by Sprint, Ariba
"Restricted Stock"	• Cancel options and immediately grant restricted stock	• No accounting expense for option cancellation • Grants made immediately • Reinstate retention and incentive • Fixed cost are known at time of exchange	• Accounting expense for restricted stock grants • Some dilution (but less than before due to less than 1:1 exchange)	• Used by Smart & Final
"Re-pricing"	• Simply lower option price on existing options to current FMV	• Reinstate incentive and retention	• Variable accounting expense • Negative shareholder reaction	• Used by Amazon.com

Source: Watson Wyatt Worldwide.

VI. Disruption Costs

The use of EBIs and incentives are heavily influenced by economics of transactions. The optimal incentive contract is one that minimizes the costs of compliance, minimizes the propensity to commit fraud, maximizes the after-tax cash benefits to the grantee, maximizes shareholder value before compensating grantees and most accurately matches performance and reward.

The ability of EBIs to create true competitive advantages for the grantor-company depends on the industry and the company's cost structure, the nature of the EBIs, and the proportion of total employee compensation attributable to EBIs. For EBIs to be truly effective, the benefits of awarding EBIs must exceed the sum of the monitoring costs, accounting costs and actual value transfer to EBI holders. Most existing EBIs don't meet this criteria.

The Disruption Costs are described as follows:

- *Cost of valuation and risk assessment* – each time an executive exercises EBIs, the stock market typically reacts. Such reaction affects not only the company in question, but other companies in the same sector. Investors typically re-asses their estimates of risk and profitability of one or more companies in the sector.
- *Information costs* – Perceived unjustified wealth transfer arising from EBI grants, EBI accounting and EBI exercises worsens the information asymmetry problems inherent in EBIs, and results in Information Costs.
- *Re-negotiation costs* – the need for EBI re-pricing often arises because current EBI holders see the underlying asset price decline below the strike price (largely due to their efforts), compare their incentives to other companies and then seek to re-negotiate. Re-pricing EBI can be a very contentious process that involves the employees, management, board of directors and sometimes, shareholders, and in the process, can reduce morale, and efficiency.
- *Compliance costs* – profitable and or unprofitable EBI exercises psychologically increase the propensity to

shirk on compliance. This is exercabated by expensing EBIs. Incremental Compliance costs – costs incurred by the company and government regulators - expensing EBIs will incur substantial transaction costs for the company and investors (There is no accepted method or valuing EBIs and companies, external auditors and financial statement users will have to retain valuation experts (Bushee & Leuz, 2004); Hirshleifer & Teoh (2003); Depoers (2000).

- *Transaction costs* - profitable negotiations of, and or exercises of executive EBI contracts may create negative responses among investors and employees, which in turn creates the need for more structured approaches to negotiating EBI contracts, hiring third-party consultants, benchmarking studies, and additional limitations and processes at exercise of EBIs - all of which increase transaction costs. Incremental Transaction Costs will only increase if EBIs are expensed, Teoh & Hwang (2000); Depoers (2000).
- *Monitoring costs* – profitable negotiations of, and or exercises of executive EBI/ESOs and employee EBI contracts may create negative responses among investors (and or some employees), which in turn create the need for additional monitoring. Existence of EBIs/ESOs increases cash and non-cash monitoring costs incurred by employees, investors and the company. Use of EBIs/ESOs causes incremental Internal Monitoring Costs and costs incurred by investors and regulators; Bontis (2003).
- *Adjustment Costs*
- Volatility costs – cost of increased volatility of the underlying stock price. Depoers (2000).
- Costs of bankruptcy – to the extent that EBIs increase the propensity to leverage the firm, there is an implicit cost of bankruptcy. Depoers (2000). Richardson & Welker (2001).
- Information asymmetry costs. Hirshleifer & Teoh (2003).
- Moral harzard costs - because EBIs typically don't incorporate the company's cost of capital, EBIs result in substantial unfair wealth transfer since the EBIs can yield substantial benefits without the firm earning a surplus in addition to its cost of capital. An alternative to the present form of EBIs is increased monitoring of employees which has a cost. Monitoring does not provide the same psychological and incentive effects as EBIs. Monitoring reduces employee risk taking and affects managerial selection of projects. The extent of monitoring depends on the agent's liability, limits and monitoring costs (which decrease as with more advances in technology). Thus, the optimal EBI contract will include both monitoring and incentive effects. Fehr & Schmidt (_______); Demougin & Fluet (______); Adams (1997).

VII. New Models/Structures For ESOs/EBIs/Incentives

The conditions for optimal incentive structures were developed in Nwogugu (2005). Also see: Broadie & Detemple (1995); Esser (_____); Heath, Huddart & Lang (1999); Aboody & Kasznik (2000); Hall & Murphy (2000); Ellis (1998); Bettis, Bizjak & Lemmon (1999). Jun, Jung & Walkling (Nov. 2005); Dybvig & Loewenstein (2003); Reingold & Spiro (1998); Bebchuk & Fried (2003); Ali & Stapledon (2000); Bernhardt (1999); Amromin (September 2003); Ming & MacMinn (June 2006); Bakshi, Cao & Chen (2000); Williams & Rao (2006); Kraus & Smith (1996); Uppal & Naik (1994); Davydov & Lintesky (July 2002). Camras & Witherington (2005); Fogel (2006); Fogel, Nwokah, Dedo & Messinger (1992); Thelen (2005); Thelen (2005); Van Geert & Steenbeek (2005). The following are some examples of alternative structures for incentive compensation that also eliminate the need for "Re-pricing" and "back-dating".

1. The Capped Option™

This option has a 'shadow Stock price" (S) and performance-based barriers and will typically be issued with the Strike Price equal to the then market price of the common stock. Dybvig & Loewenstein (2003:7). The option right exists only if the pre-specified performance targets are achieved – the option is an up-and-in barrier option. The ESO can only be exercised during pre-specified exercise 'windows' of time. The post-inception Strike Price is calculated as either: 1) a fixed amount or 2) a variable amount. There is a 'minimum reset strike price' mechanism. This will help ensure that options-holders gain profits only if the company has consistently been profitable. The strike price has to be adjusted for the effect of dividend payments. Assume that:

X = the original strike price which is calculated as the market price.

S = the shadow stock price at exercise (stock price used to calculate the ESO value). S is a function of: **a)** the average stock price at exercise calculated as the average daily stock price for the immediately preceding twelve months (S_a), **b)** an agreed-upon value of the company's equity (S_v) and **c)** a points index P, based on the value of and outcome of points awarded to the ESO holder – at the beginning of the period, the ESO holder is awarded points, and a system of awards and penalties based on points is implemented. The ESO holder earns or looses points based on his/her performance during the period. $P = P_t/P_o$, where Po and Pt are the values of points held by the ESO holder at the beginning and end of the period. This derivation of S ensures that the impact of market correlation on the stock price is minimized, that the ESO holder faces loss for mistakes and unnecessary risk, and that divergencies between market values and intrinsic-values/liquidation-values are reduced (many shareholders cannot sell their stock even if they wanted to, due to liquidity constraints, and hence face a liquidation value, as opposed to a market value).

X_f = the 'floating automatic-reset strike price' that will result in a 'capped return'.

Z = the 'capped return' in currency units (thus, $X_f = S - Z$).

R = the 'Growth strike Price' which is equal to the normal strike price multiplied by an annual or quarterly factor to reflect investors' minimum return, and the company's cost of capital, such that at time t, $R_t = R_{(t-1)}(1 + r)$; and at time 0, $R_0 = X*(1 + r)$; where r is the percentage return. Thus, R increases periodically, and the ESO grantee earns profits only if investors make a specified return.

D = the present value of expected future dividends, D is non-negative, and $D > 0$, only for dividend-paying companies.

$\boldsymbol{\rho}$ = correlation between the stock market and the company's stock price; $\rho = 0$, if the company is private.

Then at exercise at time t, the option payoff is:

$C = \text{Max}[\text{Max}(0, [S - (\{\text{Max}(J, (1+\boldsymbol{\rho}))*\max(X, R_t, X_f)\}-D)]), 0]$

The same effect (ESO grantee earns only residual returns, and ESO returns are capped) can be created by making the Shadow Stock Price S, re-settable. In this case, if S_c is the Reset Stock Price (actual price used in calculating the option value), and S_0 is the ordinary stock price at exercise time (calculated as the average daily stock price for the immediately preceding twelve months), and X is the original fixed strike price, and Z is the capped return in currency units, then: $S_c = \text{Min}[S_{0,} (X + Z)]$, and the ESO payoff at time t is:

$C = \text{Max}[0,\text{Max }[0, (S_c - (\{(1+|\boldsymbol{\rho}|)*\max(X, R_t)\} - D))]]$. This alternative can be used only when publicly-traded or measurable common stock is issued for the difference between the strike price and the exercise price.

2. The Capped Adjustable Option™

This option complete solves the "repricing", forward-dating", 'Share-repurchase', 'dividend-reduction/blockage' and "back-dating" problems; and also eliminates the effects of executives' hedging of ESOs with derivatives. Dybvig & Loewenstein (2003:7); Corrado, Jordan, Miller & Stansfield (2001); Chen (2004); Hall & Knox (2004); Brenner, Sundaram & Yermack (2000); Rogers (2005); Anonymous (Winter 2004); Lynch (2004); Aryal & Sun (2004); Buyinski & Harsen (2002); Chance, Kumar & Todd (2000). Using this option, its possible to match the magnitude of the ESO gain to the employee's achievement of pre-specified performance targets. This option has a variable strike price, and uses a 'shadow Stock Price" (S) and performance-based barriers. At inception, the option will be issued with a Strike Price equal to the then market price of the common stock. The option right exists only if the pre-specified performance targets are achieved, but the option-right will automatically expire once the in-the-money amount exceeds a certain threshold for a pre-specified period which will typically be 90-120 days– the option is an up-and-in barrier option. The ordinary Strike Price is calculated as either: 1) a fixed amount or 2) a variable amount with a 'minimum reset strike price' mechanism. This will help ensure that options-holders gain profits only if the company has consistently been profitable. The Strike Price is adjusted for the effect of dividend payments. However, if the stock price declines substantially, then obviously, it will be much more difficult for the company to achieve the required investor return while providing adequate incentives for employees – the traditional response to such problems is to reprice or back-date the options which are both problematic. This stock option contains an automatic mechanism that reduces the Strike Price as the Stock Price declines; and in this mechanism, the built-in required investor return can be capped, and can also be adjusted downwards as the Stock Price declines.

Assume that:

X_o = the original strike price which is typically set at market price.

S = the shadow stock price at exercise (stock price used to calculate the ESO value). S is a function of: **a)** the average stock price at exercise calculated as the average daily stock price for the immediately preceding twelve months (S_a), **b)** an agreed-upon value of the company's equity (S_v) and **c)** a points index P, based on the value of, and outcome of points awarded to the ESO holder – at the beginning of the period, the ESO holder is awarded points, and a system of awards and penalties based on points is implemented. The ESO holder earns or looses points based on his/her performance during the period. $P = P_t/P_o$, where P_t and P_o are the values of points held by the ESO holder at the beginning and end of the period respectively. This derivation of S ensures that the impact of market correlation on the stock price is minimized, that the ESO holder faces loss for mistakes and unnecessary risk, and that divergencies between market values and intrinsic-values/liquidation-values are reduced (many shareholders cannot sell their stock even if they wanted to, due to liquidity constraints, and hence face a liquidation-value for their shares, as opposed to a market-value).

X_f = the 'floating automatic-reset strike price' that will result in a 'capped return'. (thus, $X_f = S - Z$).

Z = the 'capped return' in currency units (thus, $X_f = S - Z$).

R = the 'Growth strike Price' which is equal to the normal strike price multiplied by an annual or quarterly factor to reflect investors' minimum return, and the company's cost-of-capital, such that at time $t \in T$, $R_t = (R_{(t-1)}(1 + \text{Min}(r,Y))$; and at time 0, $R_0 = X*\{1 + \text{Min}(r,Y)\}$; where r is the percentage return. $r \le Y$, where Y is a maximum investor return. Various rates of return (r's) can be designated for various ranges of Stock Prices.

Thus, R increases periodically, and the ESO grantee earns profits only if investors make a specified return. Note that the following conditions apply:

$0 < \partial r/\partial S < 1$;

$\partial r/\partial Z > 1$;

$-1 < \partial r/\partial K < 0$;

D = the present value of expected future dividends, D is non-negative, and $D > 0$, only for dividend-paying companies.

P = a 'state' in which performance benchmarks are achieved. P = 0, if the performance targets are not achieved and P = 1 only if the performance targets are achieved. Alternatively, P can be made to vary such that $P \in (0,1)$, and varying levels of the employee's achievement of performance targets will result in varying levels of ESO gains.

$\boldsymbol{T}$ = term of the option – in days or months. $\boldsymbol{t} \in$ T.

K = functional strike price. $K = Max[Min\{X_o, R_t, X_f\}, 0]$

Then at exercise at time t, the option payoff is:

$C = Max[0, Max\{0, (S - K\text{-}D)\}]$, if the binary P is applicable; OR.

$C = Max\{0, (S - K\text{-}D)P\}$; if the variable P is applicable - $P \in (0,1)$.

The option-right will automatically expire once the following condition occurs:

$[(S\text{-}K\text{-}D) \geq Z] \cap (t = 90\text{-}120 \text{ days}) \cap (P=1)$

The same effect (ESO grantee earns only residual returns, and ESO returns are capped) can be created by making the Shadow Stock Price S, re-settable. In this case, if S_c is the Reset Stock Price (actual price used in calculating the option value), and S_0 is the ordinary stock price at exercise time (calculated as the average daily stock price for the immediately preceding twelve months), and X_o is the original fixed strike price, and Z is the capped return in currency units, then: $S_c = Min[S_0, (X_o + Z)]$, and the ESO payoff at time t is:

$C = Max\ [0, (S_c - (max(X_o, R_t) - D))P]$. This alternative can be used only when publicly-traded or measurable common stock is issued for the difference between the strike price and the exercise price.

3. The Combination Stock Option™

The Combination Stock Option completely eliminates the need for "repricing", forward-dating", 'dividend-reduction/blockage' and "back-dating" of ESOs, and 'Share-repurchases', and 'dividend-reduction/blockage'; and also eliminates the effects of executives' hedging of ESOs with derivatives. Dybvig & Loewenstein (2003:7). Dybvig & Loewenstein (2003:7); Corrado, Jordan, Miller & Stansfield (2001); Chen (2004); Hall & Knox (2004); Brenner, Sundaram & Yermack (2000); Rogers (2005); Anonymous (Winter 2004); Lynch (2004); Aryal & Sun (2004); Buyinski & Harsen (2002); Chance, Kumar & Todd (2000). The Combination Stock Option will be settled with common stock or cash at the company's option, and is a synthesized option that effectively combines a barrier-put option and a barrier-call option, and is applicable to only publicly traded companies. The company must earn above its cost of capital and earn a minimum return for shareholders before employees benefit from ESOs. The option right comes into existence only if pre-determined performance benchmarks are achieved (ie. ROI, cash flow growth, cost reduction, quality, etc.). There will be exercise windows. At exercise, the strike price automatically resets to a strike price that will result in a put-return or a call-return to the option holder. The strike price is adjusted for the effect of dividend payments, if any. Assume that:

X = the original strike price which is calculated as either: 1) a fixed amount or 2) the rolling twelve-month daily average stock price; and

S = the stock price at exercise, and

B = the 'floating automatic-reset strike price' that will result in a 'capped return'. B is binary: $B = B_c = S - Z$, only if at exercise, $S>X$, and $B = B_p = S + Y$, only if at exercise, $X> S$.

Z = the 'capped maximum return' on the call side in currency units; and

Y = the 'capped maximum option payoff' on the put side, in currency units.

R = the 'Growth strike Price' which is equal to the normal strike price multiplied by an annual or quarterly factor to reflect the shareholders' minimum required return, and the company's cost of capital, such that at time t, $R_t = R_{(t-1)}(1 + r)$; and at time 0, $R_0 = X * (1 + r)$; where r is the percentage return.

D = is the present value of expected future dividends, D is non-negative, and $D > 0$ only for dividend-paying companies.

Then at exercise at time t, the option payoff will be:

$C = Max\{0,[max(0, max(0, [S - (max(X, R_t, B_c) - D)]))], [max(0, max(0, [(min(X, B_p) + D) - S]))]\}$.

The Combination Stock Option™, completely eliminates the need for "backdating", 'forward-dating' and "repricing" of ESOs, if the put side of the option is adjusted by making B_p equal to X; in which case the option pay off at exercise time t is:

$C = Max\{0,[max(0, max(0, [S - (max(X, R_t, B_c) - D)]))], [max(0, max(0, [(X + D) - S]))]\}$.

This is because if at ESO-exercise, the stock price drops below X, the ESO holder will get an adjusted put-type return profile, and if the stock price exceeds X, the ESO holder will get the adjusted call-type return profile. However, since the ESO holder's payoff is residual, its still possible for his/her payoff to be zero.

4. Capped Barrier Stock Appreciation Rights™

In this instance, the option right comes into existence only if pre-determined performance benchmarks are achieved (ie. cost reduction, quality, cash flow growth) – the option is an up-and-in option. There will be exercise windows. At exercise, the strike price automatically resets to a strike price that will result in a maximum pre-determined gain to the option holder. The SARs will be settled in common stock or cash.

The ordinary Strike Price X, is calculated as either a fixed amount (private companies), or as the daily average stock price for the preceding twelve months (publicly-traded companies). The strike price is adjusted for the effect of dividends.

S = the stock price at exercise, and B is the 'floating automatic-reset strike price' that will result in a 'capped return'.

Z = the 'capped return' in currency units (thus, $B = S - Z$).

R = the 'Growth strike Price' which is equal to the normal strike price multiplied by a periodic factor to reflect the investor's minimum return, and the company's cost of capital, such that at time t, $R_t = R_{(t-1)}(1 + r)$; and at time 0, $R_0 = X *(1 + r)$; where r is the percentage return. R increases periodically, and the ESO grantee earns profits only if investors make a specified return.

D = the present value of expected future dividends, D is non-negative, and $D > 0$ only for dividend-paying companies.

Then at exercise at time t, the EBI/ESO payoff is:

$C = \text{Max}(0, \text{Max}(0, [S - (\max(X, R_t, B)-D)]))$.

Similar economic objectives (ESO/EBI grantee earns only residual returns, and the ESO/EBI payoff is capped) can be created by making the indexed stock price S, resettable. In this case, if S_c is the Reset Stock Price, and S_0 is the Stock Price at exercise time t, then $S_c = \text{Min}[S_{0,} (X + Z)]$, and the ESO/EBI payoff is:

$C = \text{Max}[0, (\text{Max}\ [0, (S_c - \text{Max}(X, R_t) - D)])]$.

IX. Optimal Strike Prices For ESOs/EBIs

The foregoing derivation of ESO/EBI structures indicates that the optimal Strike Prices for ESOs/EBIs must conform to certain conditions, but should be customized to suit the company's situation. Hall & Murphy (2000). This is because: a) ESOs/EBIs have an inherent valuation problem that causes substantial uncertainly and information asymmetry, b) there are principal-agent and moral harzard problems.

The following are the general conditions for optimal Strike Prices:

1. Shareholders must earn specific returns before the employee benefits from ESOs/EBIs.

2. Must ensure that the firm earns returns in excess of its cost-of-capital before the employee benefits from ESOs/EBIs.

3. The employee's returns must be capped. This eliminates valuation and information asymmetry problems.

4. The Strike Price must be conditional on some performance measures.

5. The strike price must be adjusted for dividends.

6. The Strike price must be adjusted for expected normal growth rate of the firm.

X. Conclusion

In their present forms, EBIs/ESOs are not an efficient method of compensating or motivating employees; and will probably increase the incidence of fraud and non-compliance with regulations. Re-designed EBIs/ESOs can improve efficiency and profitability in various industries.

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